

# FLIGHT

First Aero Weekly in the World.

Founder and Editor: STANLEY SPOONER.

A Journal devoted to the Interests, Practice, and Progress of Aerial Locomotion and Transport.

OFFICIAL ORGAN OF THE ROYAL AERO CLUB OF THE UNITED KINGDOM.

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## Flight.

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## EDITORIAL COMMENT.

### "Our Phantom Air Squadron."

It is with a feeling of profound thankfulness that we see evidences around us that our efforts to arouse the public to a sense of the terrible danger the country is incurring, by the neglect of our aerial defences by the Government, have borne fruit in the shape of a simultaneous campaign against this supineness in almost the whole Press of the country. When we made our appeal to the great outer Press a fortnight ago, we did so, not because the urgency was more pronounced than hitherto, but because the time for a concerted outcry was more opportune. The Press has other things to think of besides aeroplanes; but here we are, on the eve of the Estimates, and an immediate issue to the campaign is in sight from the first. With this incentive they have taken action, and if the Government does not adequately respond to the country's voice, in the matter of a proper vote for Aeronautics, it will come in for more than mere technical criticism. Our contemporaries, truly, have done excellently well, but there still remains much to do. The thing cannot be allowed to rest until we see in the Estimates the provision of a sum adequate to gain for this country supremacy in the air as absolute as that which we enjoy at sea

During the past week or two there have appeared in the columns of our contemporaries many articles which, had we but the space at our command, we should like to reproduce in full. That is manifestly impossible, while to select one or two from among the mass of material available might seem invidious. There is one article, however, which we really feel we should do wrong to ignore. This is a most able exposition of the case as it stands from the pen of Mr. Joynson-Hicks, M.P., which appeared in the *Standard* of the 13th February. As a reasoned setting forth of our hopelessly inferior position as an aerial power it is most excellent, though we think that those who have read and studied it will agree with us that it creates a most disagreeable impression. Starting with a clear statement of the War Minister's official views on the aerial defence problem, Mr. Joynson-Hicks says:

"It will be remembered that in November, 1911, and again during the debate on the Army Estimates in 1912, Col. Seely, the Secretary of State for War, stated most emphatically that the Government realised fully the importance of an adequate aerial defence force for this country, and announced his intention that such a force should be formed. He also made plain his belief that in order to provide the *matériel* for such a force in time of war it was necessary to foster a healthy aeroplane industry in this country which should be able to supply aeroplanes and their equipment, as it would obviously be impossible to rely on a supply of machines from foreign countries when war broke out. As a corollary to this statement he said that after buying sufficient machines abroad to provide for immediate needs all future aeroplanes would be built in this country."

This speaks for itself. According to his official utterances, Col. Seely realises to the full how important it is that Great Britain should be prepared in the air as well as by land and sea. However, we will not take Mr. Joynson-Hicks' arguments out of his mouth, but will give them as put by him. Proceeding, he says:—

"Let us consider how Colonel Seely's promises have been kept, and how the aerial defences of the country stand at the present moment. The important points to consider are:—

1. The supply of military pilots and their training.
2. The supply of machines for use in war and for training purposes, taken numerically.
3. The quality and utility of these machines.
4. The sources of supply, in relation to present and future needs.

"On all these points the policy of the Government up to the present has been eminently unsatisfactory, with the net result that if war broke out to-morrow the Royal Flying Corps, as an efficient branch of our national defences, simply does not exist. . . . In the first place the supply of military pilots is absolutely inadequate. The military wing consists on paper of seven aeroplane squadrons, of twelve machines each, or a total of 84 machines and pilots. There is

also an airship and kite squadron of delightfully indefinite strength. This last may be neglected, for the kites are hardly ever used at all, and although the airship Delta is alleged to be the fastest airship in the world after the Zeppelins, she is, with her 40 to 45 miles an hour, many miles slower than even a comparatively out-of-date aeroplane, and as her fighting capacity is practically nil she is at the mercy of any moderately good aeroplane carrying a few bombs or a passenger armed with a blunderbuss. The officers of the airship squadron do wonderful performances with their tiny machines, but their vessels would be useless against any army with a modern aerial equipment."

This, of course, is all very well in its way, but, it may be asked, on what basis are we asked to assume that the Royal Flying Corps, as an efficient branch of our national defence, does not exist? Let the writer again speak for himself. This is what he has to say on that point:—

"Of the aeroplane squadrons only four have been formed, even nominally, and so far as one can gather from the last issue of the Army List not one of them has its full complement of Squadron Commander, three Flight Commanders, and eight Flying Officers. It will be seen that four squadrons need 48 pilots, and there are not 48 trained military aviators in the whole Flying Corps. If one includes officers of the Special Reserve (on probation), who are in fact civilian volunteers who undergo a three months' course at the Central Flying School before being posted to the Reserve of the Royal Flying Corps, one might find enough fairly skilful pilots to fill up the four squadrons, but even then they are not military pilots, for they have not learned to be soldiers, and know nothing of scouting from a military standpoint."

Not only is it there shown how the aerial defence has been neglected, but unfortunately the War Minister appears to have deliberately set out to make matters appear better than they are in fact, with the only conceivable object of hoodwinking Parliament and the country. We prefer to put the matter in this way rather than to express it in a shorter and harsher manner. According to Mr. Joynson-Hicks—and we take his figures as being accurate.

"Col. Seely stated in the House of Commons on January 9th that the military wing of the Royal Flying Corps possessed 29 aeroplanes, of which 26 were in flying order. So far so good; but on the 22nd, in reply to further questions, he admitted that 13 of these were monoplanes, though for some four months no flying has been permitted on Army monoplanes, and, therefore, these machines have been standing idle and deteriorating. It is an interesting commentary on the whole scheme that these monoplanes were 'hung up' for four months because Col. Seely got an attack of nerves after two bad accidents.

"Even officers of the Royal Flying Corps state that many of these machines have literally been 'rotting in their sheds.' Col. Seely admitted that some of them would have to be altered, on the advice of the committee appointed by him to investigate the alleged dangers of monoplanes, yet he includes these machines among those in flying order. Are our officer aviators to be ordered in time of war to fly aeroplanes which in time of peace are considered dangerous? It appears, therefore, that about the end of January the effective strength of the military wing was 13 biplanes, instead of 84 assorted aeroplanes, and it is well to note that of the 13 the majority are only capable of a speed of 55 to 60 miles an hour, whereas the best French military aeroplanes can do from 60 to 80 miles an hour. It is true that the Central Flying School owns some 25 or 30 machines, partly paid for by the Army and partly by the Navy, but these are school machines, most of them slower than those of the military wing.

"In any case the total number compares badly, or rather it does not compare at all, with the number owned by the French army, which started 1912 with 218 aeroplanes in flying order, and bought something over 400 up-to-date machines during the year. Germany is known to possess something like 250 aeroplanes, besides her Zeppelins and other big airships. Even Italy, Russia and Austria own 100 or more. Great Britain, therefore, as an air power ranks with Bulgaria, Greece, Spain and Turkey, but she is still superior to Oahiti and Timbaktu."

Having voiced this scathing indictment of the policy, or want of policy of the Government, Mr. Joynson-Hicks proceeds to outline his own ideas of what would constitute an adequate scheme for the future. But for the present our part is in awakening the country to the realisa-

tion that it is absolutely essential that thoroughly adequate measures must be taken to bring us into line with possible rivals.

## Foreign Airships as Nocturnal Visitors.

It seems to be more or less accepted that a German airship visited our shores in October, and no doubt this has brought about the recent Act rushed through Parliament, giving powers to officers commanding military posts to fire upon these craft if they refuse to descend when signalled to do so. There is a grim sort of humour in this, inasmuch as it is more than questionable if foreign aircraft have anything to fear since it is very far from certain that any of our coast stations are equipped with guns suitable for enforcing the provisions of the Act. However, that may be allowed to pass for the moment. Since the Sheerness affair, people have been sighting airships all over the country, and always by night. We, ourselves, do not take the matter at all seriously, and, not to put too fine a point upon it, we incline very much to the belief that these phantom airships are quite imaginary craft. But there is a terribly serious side to the matter all the same, and that is that although these airships may have been the phantoms of imagination, there is no doubting that had it been so determined they could have been stern realities. It is not probable, we repeat, that these were foreign visitors, but we cannot get behind the fact that if Germany wants to send airships to cruise over these islands there is no one to say her nay. She has the craft fully capable of making the extended trips demanded by such an enterprise, and we have nothing that can tackle them. The truth may be unpalatable, but it is there nevertheless. In our review of Mr. Joynson-Hicks' article we have confined ourselves almost entirely to the disparity existing between this country and others in the matter of aeroplanes. So far as dirigibles are concerned, the position is even worse. The *Illustrated London News* this week published a double page engraving setting out graphically the relative strength of the various Great Powers in this arm of the aerial service, which is far more illuminating than mere words, and which shows us up in a sorry light indeed. One of these days we may wake up.

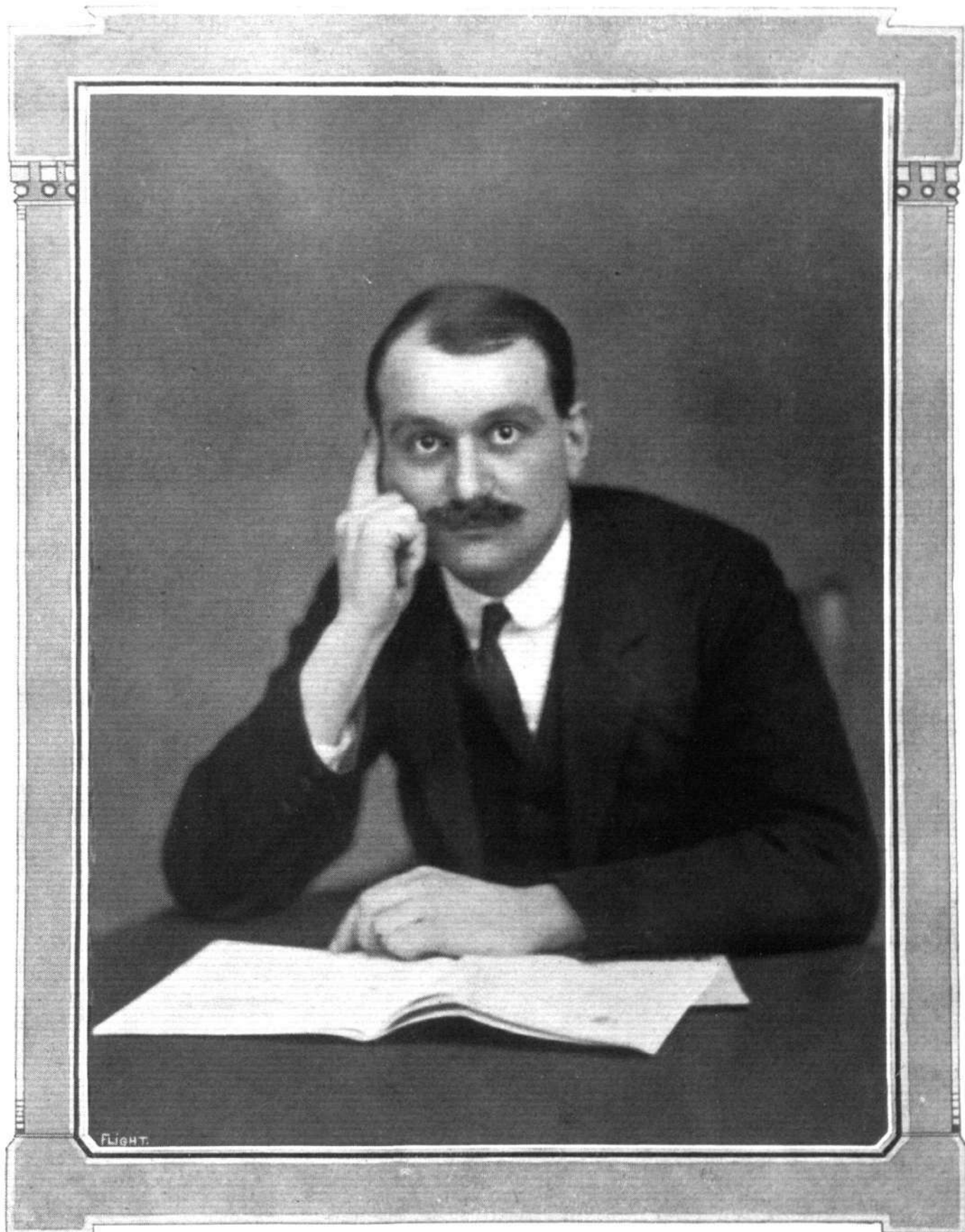
## Progress in the Navy.

In the midst of a dark outlook there seems to be one bright spot. We have always held the belief that the First Lord of the Admiralty has a real grasp of the necessities of aerial defence and his latest move would indicate that this is so. During the recent aero show the Admiralty purchased several machines of varying types, and tests will be made to determine the best types to be stationed at various points round the coast, each separate station being equipped with machines of a single type. Thus it will be possible to secure homogeneous squadrons and, at the same time, to gain all possible experience with each and every type suitable for use in the Navy. Mr. Churchill and his advisers are to be congratulated upon this evidence of their alertness to the needs of the moment. At the same time, this does not affect in the least what we have said regarding our state of general unpreparedness, for the manifest reason that the naval type of aeroplane has been slower in its evolution than the military machine, and while delay may have been justifiable in one case, it has been reprehensible to the point of criminality in the other. And the whole fault rests with the lack of funds supplied by the Government.

MARCH 1, 1913.

**FLIGHT**

**MEN OF MOMENT IN THE WORLD OF FLIGHT.  
Pioneer Constructors.**



MR. F. HANDLEY PAGE.



## LIEUT. CALDERARA AND HIS HYDROVOL.

AN interesting personality just arrived in England is Lieut. Mario Calderara of the Italian Navy, whose name is well known to all readers of *FLIGHT* as the pioneer of service aviation in his own country. Among those who flew over the Arab lines when aeroplanes made their debut in warfare, were several of Lieut. Calderara's pupils, and on that occasion Lieut. Calderara's duties were, for the most part, those of organisation and supervision.

Lieut. Calderara has come to England in the interests of his "hydrovol," to which we referred in *FLIGHT* on November 23rd last, and because he realises that this country is perhaps more interested than many others in rapidly expanding her aerial forces and should, therefore, afford a promising field for the development of a machine that is essentially designed for service work at sea.

The Calderara "hydrovol" is a singularly interesting monoplane and one of the largest in existence, for it has a wing surface of 770 sq. ft., a span of 66 ft. and a carrying capacity for three men in addition to fuel and oil for 6½ hours with a 100-h.p. Gnome. The weight is 2,644 lbs.

That which is of the greatest interest about the "hydrovol" is the design of the substructure by which it is supported on floats.

Lieut. Calderara, being an officer of the Italian Navy, looks at the hydroplane from a very practical standpoint and realises some of the essentials that have not perhaps altogether been grasped by those who have less idea of the use that will be required of such machines under actual conditions. In the first place he has succeeded in providing a wide base for his machine on the water, the outside floats being 21 ft. apart.

Secondly, the centre of gravity of the system is only 4 ft. 6 ins.

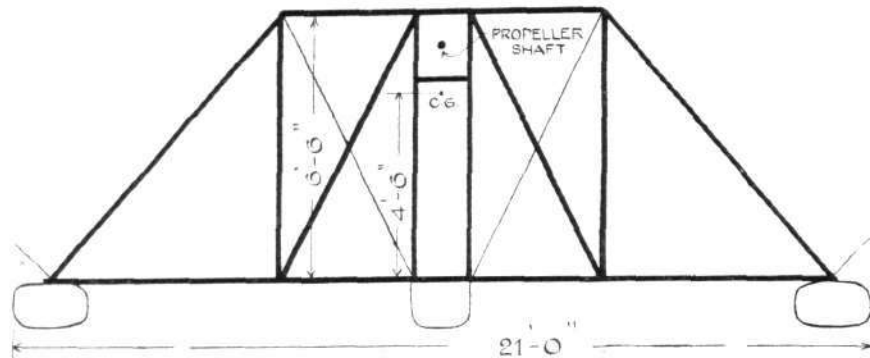
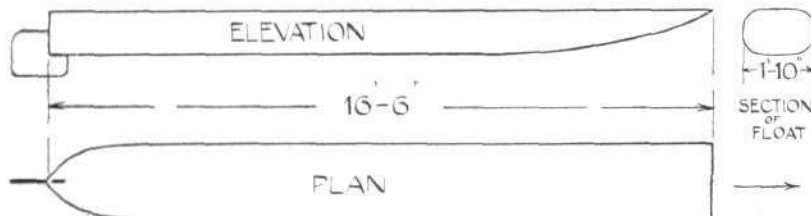


Diagram illustrating the general nature of the substructure of the Calderara hydrovol.



Plan elevation and section of the Calderara floats.

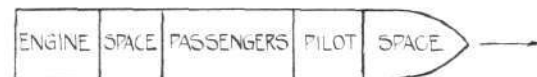
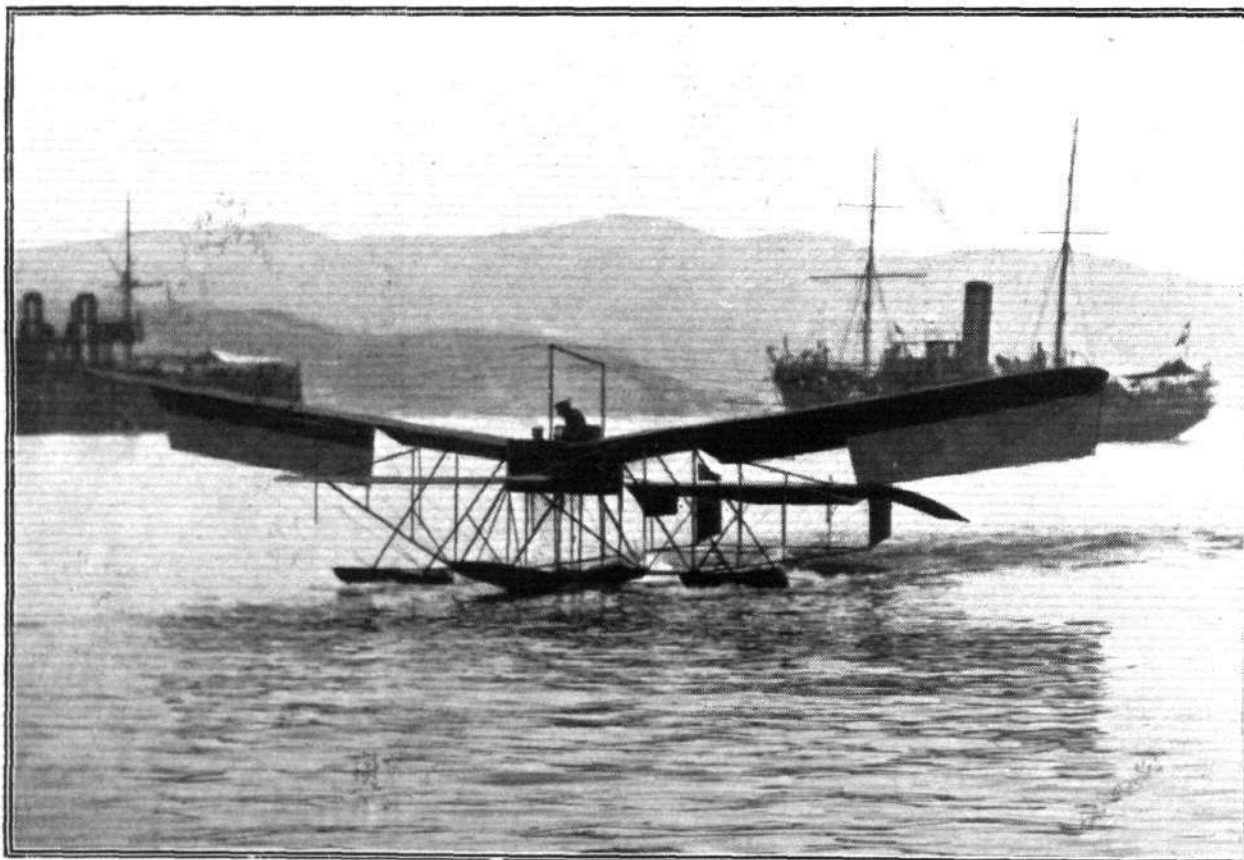
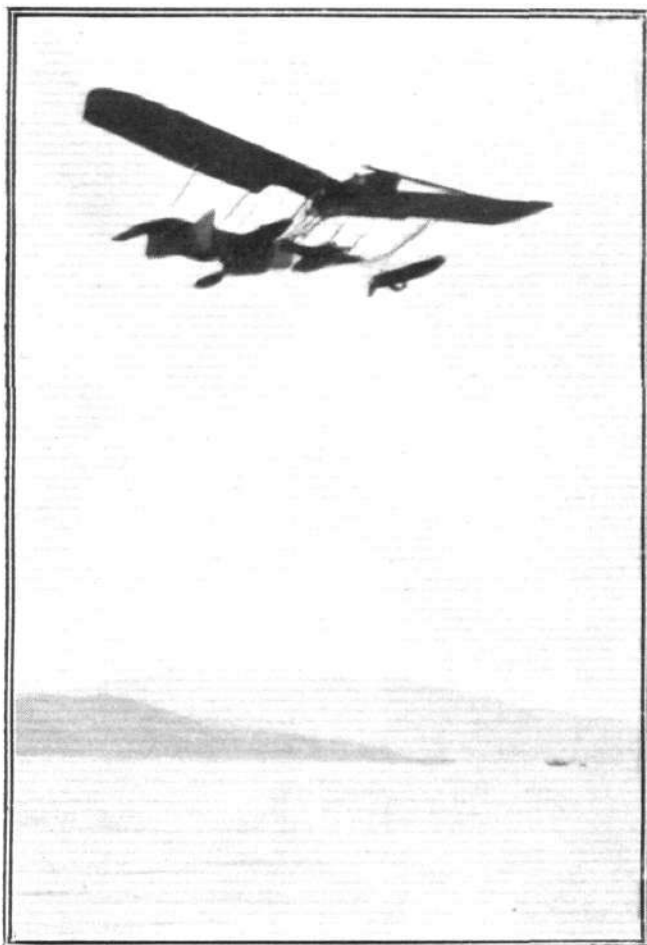


Diagram illustrating the disposition of the engine, passengers and pilot in the body of the Calderara hydrovol.



LIEUT. CALDERARA'S "HYDROVOL" ALIGHTING ON THE SURFACE OF THE WATER.—This is one of the largest monoplanes in existence, having 770 sq. ft. of wing surface. It is of singularly interesting construction, for the hydroplane floats are no less than 21 ft. apart, and the centre of gravity is only 4 ft. 6 ins. above the water line, so that the machine possesses great lateral stability when afloat. In emergency it is possible for the occupants to leave the body of the machine and take refuge on the understructure which serves as a raft. An emergency sail can also be rigged, and facilities have been made for cutting adrift the wings if the machine gets caught at sea in a high wind and is disabled.





Lieut. Calderara's "hydrovol" in flight.



Lieut. Mario Calderara, of the Italian Navy, who pioneered service aviation in his own country, and who trained several of the pilots who flew in the Tripoli campaign.

above the water line and is so disposed relatively to the floats as to eliminate any tendency to slew sideways when first striking the water. A considerable portion of the weight is carried on the large tail, which is mounted at the rear extremity of an openwork frame that is more like those used on the Farman biplanes than it is like anything ordinarily employed in monoplane construction.

Realising that the occupants of aeroplanes used in service work at sea may often be in difficulties through disablement that necessitates their landing on the water in foul weather, the designer has been at some pains to construct the floats and their attachments so as to form a complete unit that can in emergency be used as a raft. With the same object in view it has been sought to make the wings readily detachable, so that under such circumstances if the machine was obviously in danger of foundering the wings might be cut adrift. Small sails can be hoisted on the uprights, and a successful experiment of this kind has actually been made.

Lieut. Calderara's present machine has a 100-h.p. Gnome engine, but another is building for the Italian Navy under the supervision

of the designer's brother, who is an officer in the Italian Army, and will be fitted with one of the new 160-h.p. Gnome engines. The engine and propeller are situated behind the main wings, the cockpit for the passengers is in front of the engine and the cockpit for the pilot is in front of that for the passengers. In front of the pilot again, the body projects still further to afford space for a gun or other appliance.

As seen in the illustrations, which have very courteously been supplied to us by Lieut. Calderara himself, the wings of the machine have a pronounced dihedral angle, but in future this feature will be abandoned. Hinged balancing planes of 88 sq. ft. surface each, are let in to the trailing edges of the wings, and are operated by the single wheel control, which also works the front and rear elevators and the twin rudders.

We also give diagrams prepared from rough sketches made by the designer, showing the shape of the floats which weigh only 53 lbs. each, and the arrangement of the structure immediately above the floats.

## BROOKLANDS AERO CLUB FIRST ANNUAL DINNER.

ON Friday evening of last week, at the Trocadero, the Brooklands Aero Club held their first annual dinner, under the chairmanship of Mr. T. O. M. Sopwith. About 30 members and guests were present, the guest of the evening being Mr. Mervyn O'Gorman, Superintendent of the Royal Aircraft Factory. Replying to the toast of "The Visitors," Mr. O'Gorman made a speech that struck a note well worthy of attention, for he emphasised the importance of co-operative progress among members of the aeroplane industry, and showed why the individual success of one firm should be applauded by others as redounding to the common good that all had at heart.

Proposing the health of the Chairman, Major Lindsay Lloyd, who has himself done so much to make Brooklands popular among motorists and fliers, paid high tribute to the pioneer work of Mr. T. O. M. Sopwith, who has been a leading spirit of the Brooklands Aero Club since Brooklands first became a flying ground.

Incidentally Major Lloyd announced that arrangements had been made by which Mr. Gustav Hamel would visit Brooklands to give exhibition flights, and also that the Shell Co. had very generously

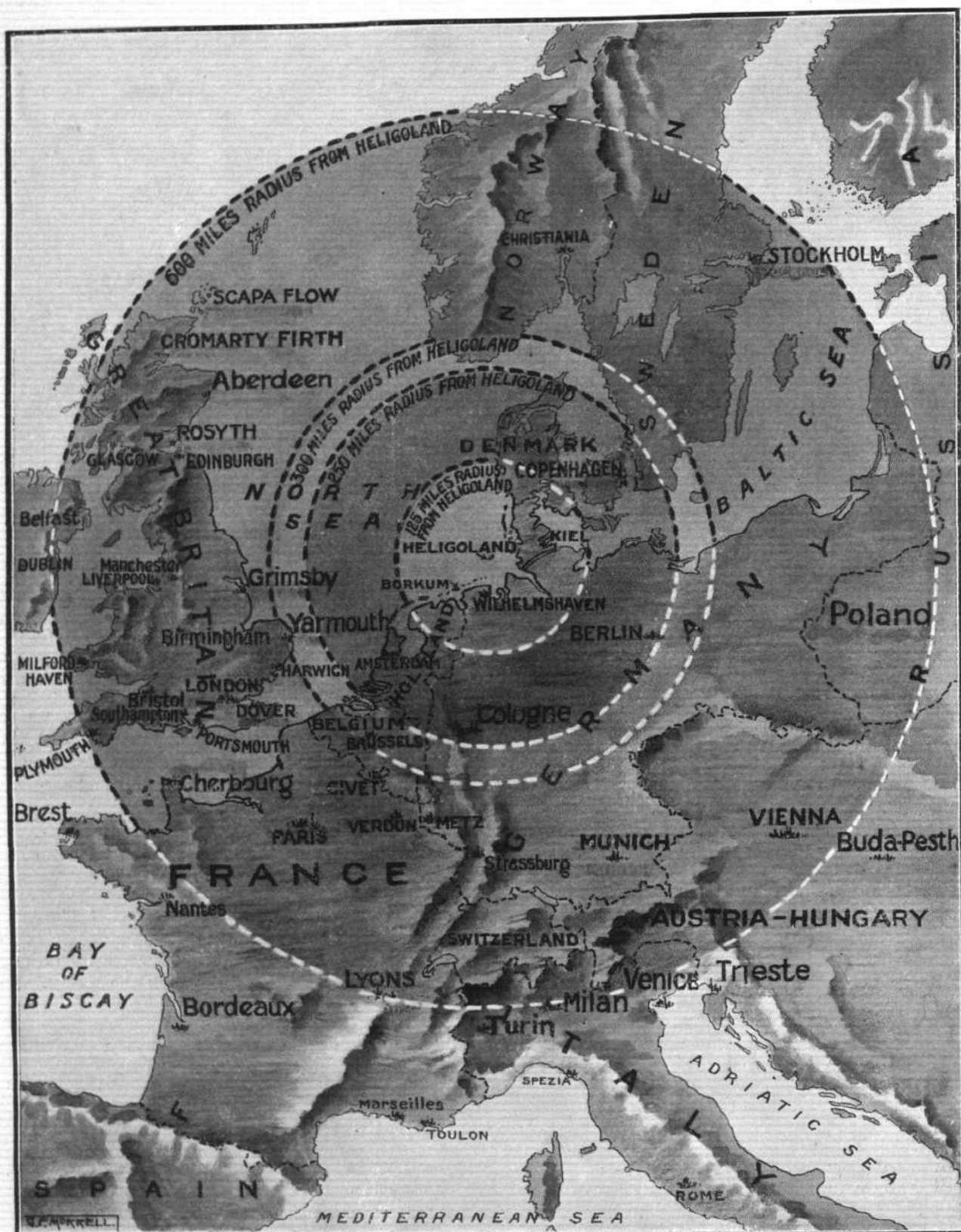
offered a prize of £50 to be competed for among Brooklands pilots in such manner as they themselves might decide best.

Mr. Cody, after saying that he hoped to make more frequent appearances, went on to defend his Cathedral. He believed our present aeroplanes were but mosquitoes as compared to the machines which would be in use within the next ten years. His next machine would be a great deal bigger than any of his previous biplanes, and he felt sure it would be more effective.

### Mr. Hucks at Newcastle.

FLYING was very much in the air at Newcastle on Saturday, as not only did Mr. Hucks make a number of ascents on his Blériot at Gosforth Park, but there was the arrival of several of the Army aviators. Mr. Hucks was unable to make his projected flight along the Tyne from Scotswood to Tynemouth on account of fog, but he went up several times and gave exhibitions of fancy flying. In the intervals between his trips Mr. Hucks gave impromptu lectures on his experiences, greatly to the delight of the spectators.

# **"THE BLACK SHADOW OF THE AIRSHIP."**

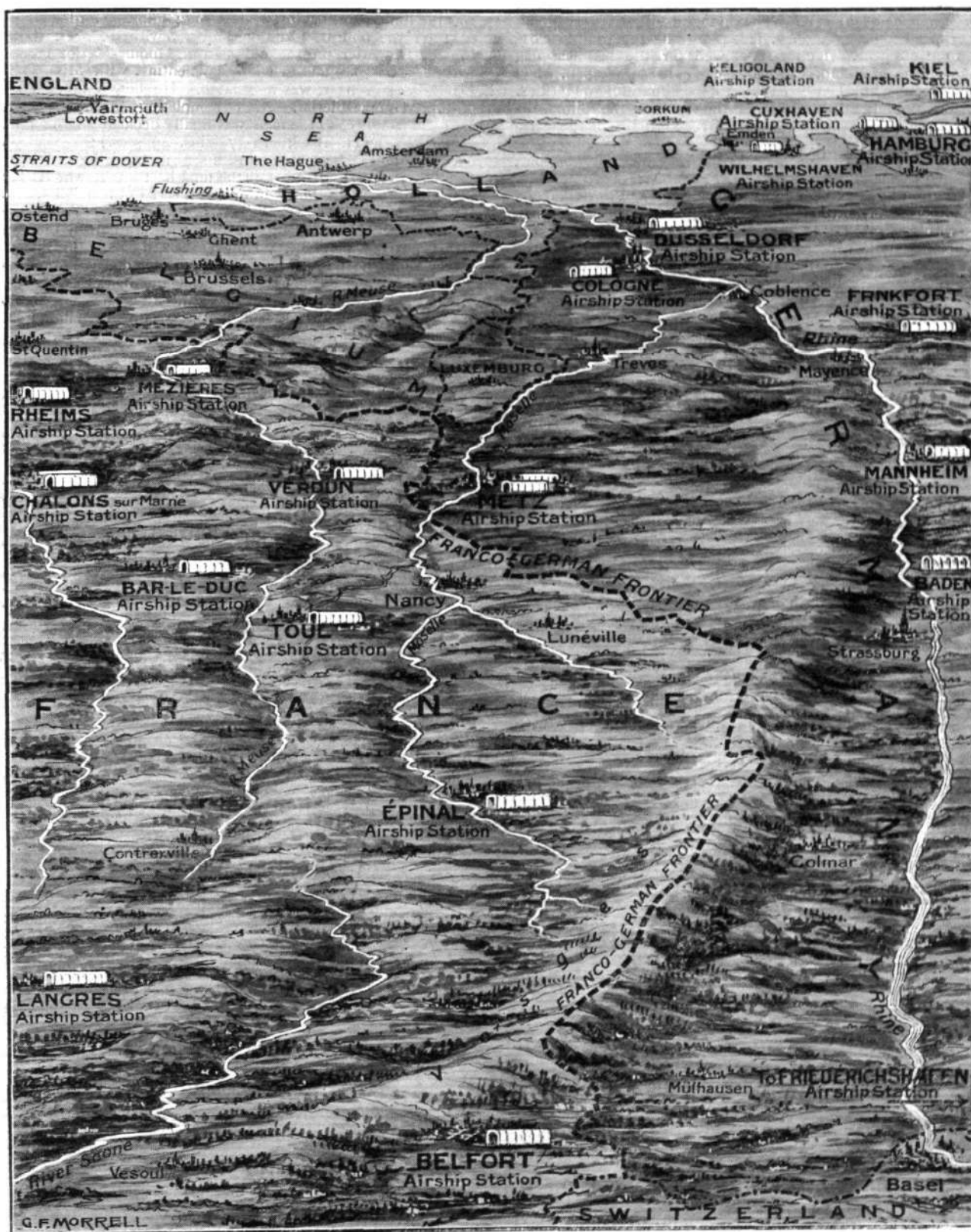


Last week we published a map of England and some excerpts from the article in the *Review of Reviews* dealing with the Peril of the Air. This week, by courtesy of the *Review of Reviews*, we are able to give two other graphic illustrations of the possibilities of attack by airship by Germany, which should bring home to every patriot the vital necessity of Britain putting her house in order forthwith, by the grant of adequate provision in the nation's Estimates to enable us to make up the heavy leeway from which this country already suffers. In the above, the outer circle, which embraces the whole of Great Britain, shows the radius of an out-and-home journey of the German airships starting from Heligoland. If these were based at Borkum, the distances would be much reduced to London and the south of England. The 300 miles circle may be taken to represent the radius of aeroplane action.



# HOW FRANCE AND GERMANY PREPARE FOR WAR IN THE AIR.

THE AIRSHIP STATIONS ALONG THE FRANCO-GERMAN FRONTIER.



In the above drawing from the *Review of Reviews* it will be observed that there are no less than eight airship stations established to be available for the shortest line of attack upon Great Britain's new strategic frontier. There is only one on the Russian frontier, and three or four on the French.

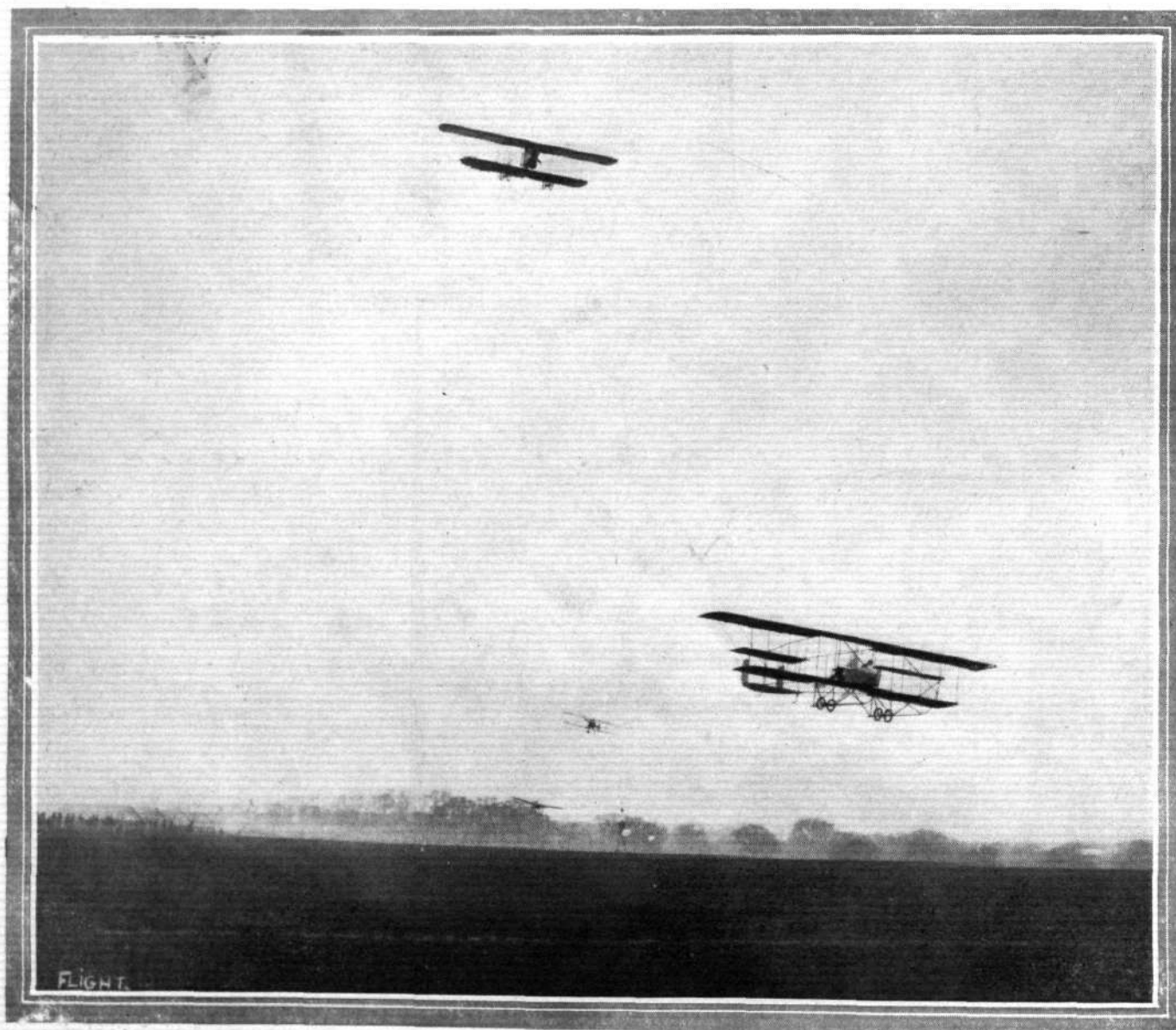


# THE AERO SHOW TROPHY CONTEST, HENDON.

HENDON held its first race meeting of the 1913 season last Saturday afternoon, and achieved a marked success, which looks very promising for the subsequent meetings. The weather, though somewhat cold, was ideal, for only a slight easterly wind was blowing, and there was a pleasant freedom from mist, which has been much in evidence at the aerodrome during the winter season. The number of visitors, too, that turned up was quite reminiscent of old times. There were, we should think, at least three or four thousand present, many of whom came in cars. The flying itself was very good, whilst the speed contest was conspicuous for the remarkably close finishes to each heat, which speaks well for the handicapping—a by no means easy job, especially early in the season, when some of the machines are likely to be doubtful quantities. After a few preliminary trial-flights by some of the pilots, the first heat of the speed contest was flown over four laps of the aerodrome, a distance of about six miles. There were five starters, as follows:—Marcus D. Manton, on the 50-h.p. Grahame-White 'bus, with 2 mins. 18 secs. start; Lewis W. F. Turner, on the 60-h.p. Anzani-Caudron biplane, who had bad luck, and had to retire from the race; Pierre Verrier, on the 70-h.p. Renault-Maurice Farman biplane, with 28 secs. start; Gustav Hamel, on the 50-h.p. Gnome-Blériot monoplane, with 5 secs. start; and E. Richet, on the 110-h.p. Canton-Unné (horizontal) Breguet biplane—the same, by-the-way, that took part in the British army trials—who was at scratch. Manton's wonderful old biplane was soon overhauled by the three other machines, though it made a brave attempt to keep well in front. As the last lap approached, the three machines

gradually closed up, until they practically crossed the finishing line together. Verrier came in first, Richet and Hamel following 3 secs. later, the latter being only  $\frac{1}{2}$  sec. behind Richet. The handicap flying times were as follows: Verrier, 8 mins. 41 secs.; Richet, 8 mins. 44 secs.; Hamel, 8 mins. 44 $\frac{1}{2}$  secs.

The second heat, though not quite so exciting, was a good race, nevertheless. H. Blackburn, on the 50-h.p. Blackburn monoplane—which has been fitted with a new propeller, and flies much better—was the limit man, having a start of 2 mins. Gordon Bell came next on the 60-h.p. Caudron biplane, with 40 secs. start, then Marcel Desoutter on the old 50-h.p. Gnome-Blériot monoplane, with a start of 13 secs. James Valentine, with Miss Trehawke Davies as passenger, was at scratch. He flew a tandem 2-seater 70-h.p. Gnome-Blériot. After completing three laps, Gordon Bell had to retire, so the race was finally decided in the following order. First, H. Blackburn (7 mins. 49 secs.); second, James Valentine and passenger (8 mins. 2 secs.); third, Marcel Desoutter (8 mins. 16 secs.). Just before the final heat was flown, R. T. Gates proceeded to cut up the air into little pieces in the neighbourhood of No. 1 pylon on the "G.W." 'bus, while Lewis Turner gave an exhibition flight of about five minutes' duration on the Caudron biplane, after which Gustav Hamel executed one of the finest cork-screw glides he has ever made, which included a new "spasm." This consisted of a semi-side slip during one of the spirals, so that one of the latter is apparently "missed." In all he made six spirals. As soon as Manton, who had, in the meanwhile, taken up a lady passenger, landed, the final heat of the speed contest was held.



A speed handicap, with four in it, at Hendon aerodrome on Saturday, showing Turner's Caudron and Verrier's Maurice Farman, in front, during the first heat.

Four competitors lined up for this heat, which was of eight laps, and some very fine airmanship was displayed.

The first man off was Harold Blackburn, who had a start of 3 mins. 20 secs.; Verrier came next with a start of 1 min. 34 secs.; then Richet with 38 secs. start to his credit, and Valentine (scratch) with Miss Davies last. Although spread out at first, the machines soon began to draw together, and several exciting "passes" were made. Valentine, with his passenger effectively "stream-lined," cut the pylons very close, as did Richet, who banked his machine, when turning, in an alarming manner. It won him the race—and the Aero Show trophy—however, and a stiff tussle for second place ensued between Verrier and Blackburn, the former obtaining it by a bare four-fifths of a second. Valentine came in a little over one second behind.

After this exciting finish, numerous exhibition flights were made, there being at one time five machines in the air together. These were:—Manton on the 'bus, Verrier on the Maurice Farman, Turner on the Caudron (each with passengers), Desoutter stunting on the Blériot, and Spratt on the small Deperdussin monoplane. Gordon Bell made another flight on the Caudron, while Richet and Verrier made passenger flights on the Breguet and Maurice Farman biplanes respectively. Further flights were made by Manton, Richet, Verrier, and Spratt, before the proceedings were brought to a close.

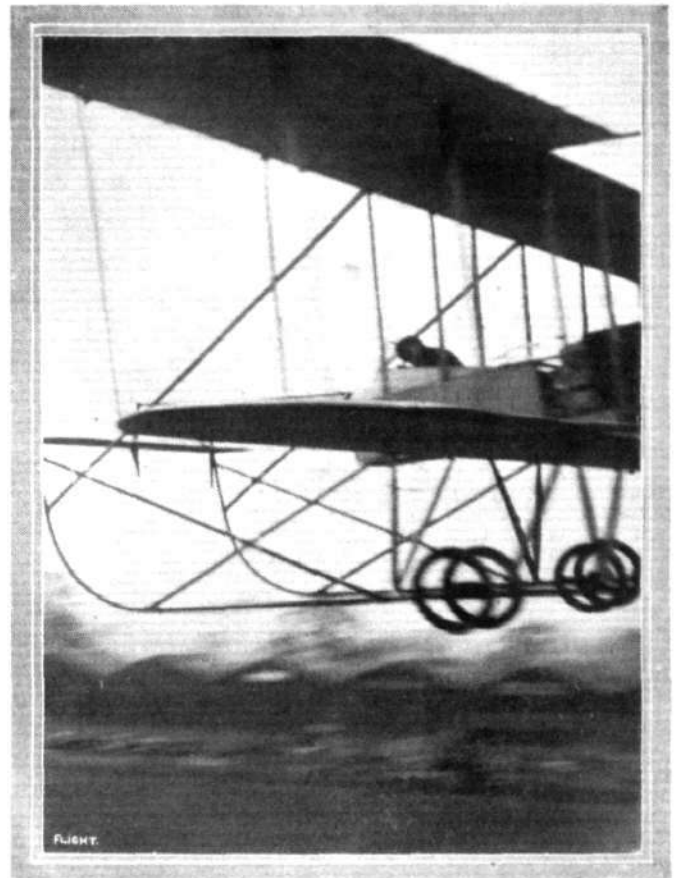
Sunday, being another bright day, brought out most of the previous day's pilots and machines, and also a decent number of visitors. Gustav Hamel left for Brooklands on his Blériot during the afternoon, the journey taking him nearly 40 minutes, owing to the adverse wind.

#### Grand Speed Handicap for the Aero Show Trophy. Final Heat of 8 laps.

Name.	Start.	Handicap	Net
	m. s.	m. s.	m. s.
1. E. Richet (110-h.p. Canton-Unné-Breguet biplane) ...	0 38	14 57	12 15
2. P. Verrier (70-h.p. Renault-Maurice Farman biplane) ...	1 34	15 12	13 26
3. H. Blackburn (50-h.p. Gnome-Blackburn monoplane) ...	3 20	15 12½	15 12½
4. James Valentine and Miss Trehawke Davies (70 h.p. Gnome-Blériot monoplane) ...	Scratch	15 14	11 54

#### The Government and the Aero Show.

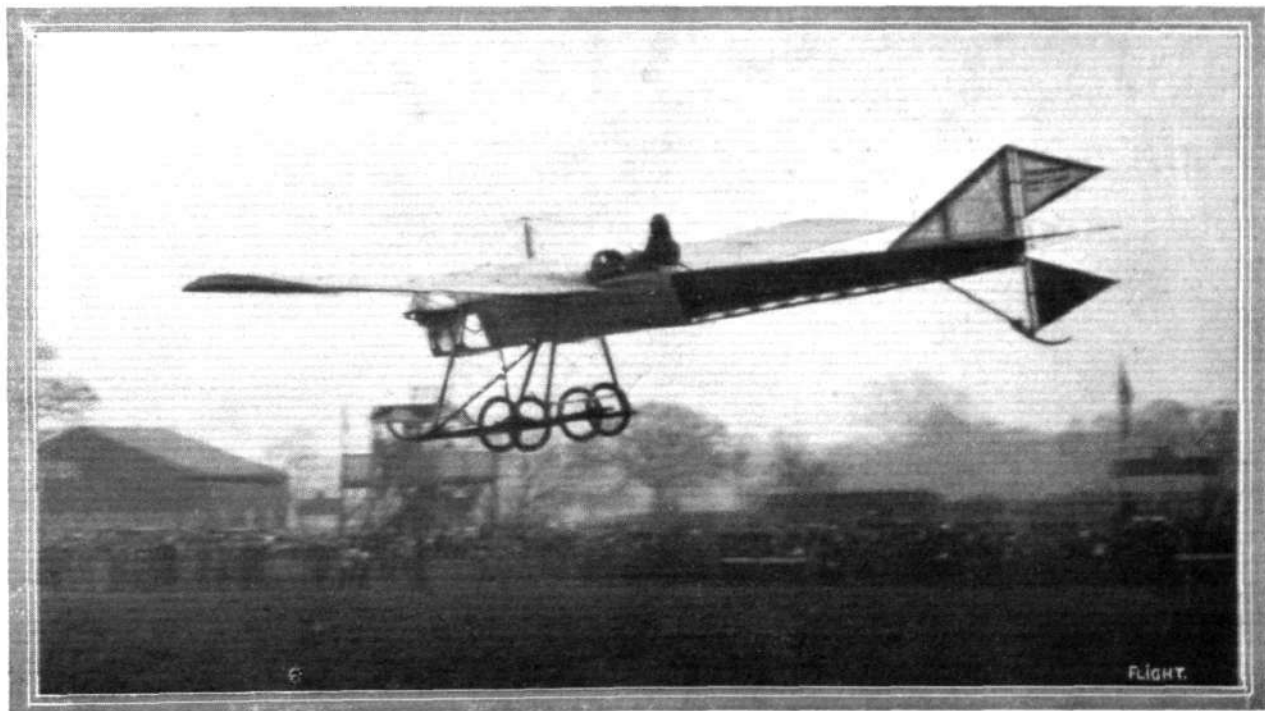
It is satisfactory to learn that the Government did not neglect the opportunity to do some shopping at Olympia, so giving a practical backing to the impetus imparted by the show to public opinion concerning aeronautics from a national point of view. It is not altogether easy to get official information, but it appears that among the purchases by the Government were those of the Short



"Flight" Copyright.

**SPEED.**—Pierre Verrier, well under the windscreen, flying past No. 1 pylon at Hendon on his Maurice Farman.

hydro-biplane, the Avro biplane, two Bristol biplanes, two Farman biplanes, the Sopwith bat-boat and two Sopwith biplanes, a Vickers biplane, a Caudron biplane, four Deperdussin monoplanes, two of the hydro type, a Blériot monoplane, and the Borel hydro-monoplane. No doubt King George's keen interest in the machines has induced the Government to give this sign of awakening at last.



"Flight" Copyright.

Mr. Blackburn, on the Blackburn monoplane, flying in Saturday's race, for the Aero Show Trophy.



# The Royal Aero Club of the United Kingdom

OFFICIAL NOTICES TO MEMBERS

The Annual General Meeting of the Members of the Royal Aero Club of the United Kingdom will be held at 166, Piccadilly, London, W., on Wednesday, March 19th, 1913, at 4 p.m.

## AGENDA.

1. To elect Hon. President, Vice-Presidents and Council for the ensuing year.
2. To announce result of ballot for Committee.
3. To confirm rules.

[A set of new Club Rules will be submitted to the Members at the General Meeting for confirmation. The Committee do not propose to incur the expense of sending a print of the new rules to every member of the Club, but copies will be available at the meeting, and any member can obtain a print beforehand on application to the Secretary.]

## Committee.

In accordance with the rules, the Committee shall consist of eighteen members. Members are elected to serve for two years, half the Committee retiring annually. Retiring members are eligible for re-election.

The retiring members of the committee are:—

Griffith Brewer.	Prof. A. K. Huntington.
Capt. Bertram Dickson, R.F.A.	F. K. McClean.
John D. Dunville.	Alec Ogilvie.
Col. H. C. L. Holden, C.B., F.R.S.	Mervyn O'Gorman.
	C. F. Pollock.

Any two members of the Club can nominate a member to serve on the Committee, having previously obtained such member's consent. The name of such member so nominated, with the names of his proposer and seconder, must be sent to the Secretary in writing not less than fourteen days before the Annual General Meeting. Wednesday, March 5th, is the last day for the receipt of nominations.

The following members have so far been nominated:—

Griffith Brewer.	F. K. McClean.
Ernest C. Bucknall.	Alec Ogilvie.
Col. H. C. L. Holden, C.B., F.R.S.	Mervyn O'Gorman.
Prof. A. K. Huntington.	C. F. Pollock.
Major F. Lindsay Lloyd.	

Members are reminded that a ballot paper for the election of nine candidates to seats on the Committee of the Club will be forwarded to them at least seven days before the date of the Annual General Meeting.

## ANNUAL DINNER.

The ANNUAL DINNER will take place at the ROYAL AUTOMOBILE CLUB, PALL MALL, S.W. (by kind permission), on THURSDAY, MARCH 13th, 1913, at 7.30 for 8 o'clock.

(Since circularising the members it has been found necessary to alter the date from March 6th to 13th.)

In order to facilitate the arrangements, Members are requested to notify the Secretary as early as possible, if it is their intention to be present, and at the same time give the names of their Guests, if any.

Members may be accompanied by Ladies.

Tickets (exclusive of Wines and Cigars)—15s. each.

The following prizes won during the year will be presented:—

The British Empire Michelin Trophy No. 1, to H. G. Hawker.

The British Empire Michelin Trophy No. 2, to S. F. Cody.

An entertainment will take place after the Dinner.

## Competitions Committee.

A meeting of the Competitions Committee was held on Tuesday, February 25th, 1913, when there were present:—Col. H. C. L. Holden, C.B., F.R.S., in the Chair, Mr. Ernest C. Bucknall, Capt. A. E. Davidson, R.E., Prof. A. K. Huntington, Major F. Lindsay Lloyd, Mr. F. K. McClean, Mr. Alec Ogilvie, Mr. Mervyn O'Gorman, Mr. A. Mortimer Singer and the Secretary.

The Mortimer Singer Prize.—The rules to govern this prize were drawn up and ordered to be submitted to the Executive Committee.

British Empire Michelin Cup No. 1.—The rules to govern the prize for the year 1913 were drawn up.

Certified Tests.—The observer's report of the flights of the Dunne biplane without personal manipulation of controls was considered, and it was unanimously decided to issue a certificate of the performance.

## Gordon-Bennett Aviation Cup.

The Royal Aero Club has sent in to the Aero Club of France a challenge to compete for the Gordon-Bennett Aviation Cup, the race for which takes place in France in the autumn of this year.

The Royal Aero Club has received entries from the British and Colonial Aeroplane Co., Ltd., Gustav Hamel and James Valentine. 166, Piccadilly.

HAROLD E. PERRIN, Secretary.

## FROM THE BRITISH FLYING GROUNDS.

### Brooklands Aerodrome.

TEMPTED by the lovely evening, at midnight last Saturday, Mr. Merriam went for a cross-country flight on the Bristol biplane, taking up with him Lieut. Blatherwick, one of his promising pupils, who was quite delighted with the novel experience.

On Sunday, Mr. Hamel left Hendon in the fog shortly before 3 o'clock, and flew to Brooklands in the teeth of a strong head wind, and shortly after 3 o'clock those on the lookout espied a tiny speck in the sky, which proved to be Mr. Hamel on his racing Blériot monoplane, travelling at an altitude of well over 3,000 ft. On arriving over the flying ground, Mr. Hamel descended in one of his spiral descents right in front of the large number of spectators who had been admiring his graceful landing, and who broke out into a perfect storm of applause. After a brief rest, Mr. Hamel again went up and treated the people to another wonderful display, demonstrating the perfect ease with which an up-to-date machine can be controlled by an experienced pilot.

Mr. Hamel has promised to visit Brooklands again next Sunday, and those who have not yet seen him will have an opportunity of doing so.

On Sunday afternoon, too, Mr. Barnwell made a fine flight on the Vickers monoplane, thus giving the people an opportunity of comparing the more solidly built Vickers with the slender racing Blériot used by Mr. Hamel.

Mr. Merriam was also out solo and with passengers on the Bristol biplane; and Mr. Raynham made a fine flight on the Coventry Ordnance biplane.

Next Sunday a Speed Handicap has been arranged, the entrants being Mr. Barnwell, Mr. Knight, Mr. Merriam, Mr. Bendall, Mr. Hawker, Mr. Spencer and Mr. Raynham.

**Bristol School.**—The weather was against outdoor work all last week right up to Saturday, when things improved somewhat, and late in the morning, after the fog had cleared, Bendall made a test. Mr. Archer went up for a solo, after which Bendall made another test and found it very bumpy. Later he tried again and found it much better. Mr. Archer then went for the second part of his ticket, which he obtained in first-class style, in a very choppy wind. Merriam finished the morning's work with a short solo. In the afternoon Merriam gave a flight to a prospective pupil, and found the conditions very bumpy. Later gave a trip to Lieut. Warlow, another prospective pupil, who is about to join the school. The wind was still too bad for pupils.

On Sunday Merriam made several circuits. Later, after the wind had dropped a little, he gave an instructional flight to Mr. Blatherwick. This pupil went for a moonlight trip as passenger with Merriam about 12 o'clock on Saturday night, when it was perfectly calm and clear. It was ideal for flying and quite safe, but, of course, it was frightfully cold, it being a frosty night. Bendall was out for several solos, and also took several pupils for flights. Merriam finished the day's work by taking Lieut. Robertson Dobie for two circuits.

**Vickers School.**—Monday last week, new pupil taxiing No. 3 monoplane up and down the ground, doing very well for the first attempt. On Saturday, in the afternoon, Mr. Barnwell out on No. 5 mono flying for about an hour, and on Sunday he was out on the same machine in the afternoon, at about 4,000 ft.

**London Aerodrome, Collingdale Avenue, Hendon.**

**Graham-White School.**—From Monday to Friday inclusive last week weather too bad for school practice. Saturday, practice commenced at 8.10 in the morning when a new pupil, Mr. Birchenough,



was rolling on the school bus No. 7 with Instructor Manton in the passenger seat; later the same pupil was rolling alone and doing well. Manton was out later, at 8.50, testing *brevet* machine for the other more advanced pupils.

**Aircraft Co. School.**—Verrier left the aerodrome on Wednesday last week at 10, arriving at Farnborough on a new Maurice Farman an hour later. Owing to fog, he made a detour by going to Brooklands. Many fine flights were made by Verrier with passengers on Saturday, and on Sunday he was out all the afternoon with passengers.

Accompanied by Mr. Frank Mills, Verrier started on Monday for Farnborough at 12.30, arriving there at 1.40. During the flight he attained an altitude of 7,000 ft., and at that height seemed to be making no progress at all against the strong head wind, although he afterwards said he did not find it once necessary to use his *ailerons* at that altitude. After luncheon Mr. Mervyn O'Gorman enjoyed a flight with Verrier of about 10 mins. duration.

**Blackburn School.**—The high wind which was blowing prevented any school work being got through last week. On Saturday afternoon, Mr. H. Blackburn flew the school 'bus in the Aero Show Speed Contest, finishing first in his heat, and third in the final, a very good performance for a school rolling machine. After the race Mr. Blackburn gave an exhibition flight of 10 mins. On Sunday afternoon he made two exhibition flights, being up for about 15 mins. each time.

**British Deperdussin School.**—Strong gales all last week, no school work possible before Saturday, when Mr. Spratt took out No. 4 machine to test conditions. Finding everything favourable, handed over to Lieut. Hawker, who flew a couple of circuits and figures of eight afterwards. Later four figures of eight, after which he went up for his *brevet* test, passing in good style, one landing being on the mark. He attained an altitude of 250 ft. Mr. Whitehouse then followed with a couple of circuits on same machine. In the afternoon Mr. Whitehouse gave a short exhibition flight, and Mr. Spratt a couple of exhibition flights after the racing had finished.

Monday last, Mr. Spratt two circuits, but found wind too strong for pupils. A new pupil, Mr. F. Hudson, joined the school, and had his first lesson from Mr. Spratt, afterwards rolling on Taxi 2. Later Mr. Spratt a couple of circuits on No. 4 machine.

**W. H. Ewen School.**—The pupils at the school have been able to get in some good practice during the past week, notwithstanding that the weather was favourable on only two occasions. On Friday, Mr. Gordon Bell was out on the 60-h.p. Caudron biplane in a strong wind, and put up some excellent flying.

The pupils were out at 7.15 on Saturday morning and put in



Mr. John Alcock, who has been doing so much good flying work at the Maurice Ducrocq flying school at Brooklands. Mr. Alcock has put up a lot of cross-country work, both with and without passengers, and has secured several wins in the competitions at the Weybridge aerodrome.

some useful work. After a test flight by Mr. Lewis W. F. Turner, Lieut. J. D. McMullen was on the 35-h.p. Caudron doing some excellent circuits and neat landings. Lieut. Bayly made several nice straights and half circuits on the same machine. Mr. Turner was on the 60-h.p. Caudron, and later, when the wind rose, gave long passenger flights to Messrs. Lawford, Stewart, Prosser, Gist



A quartette of pupils at the Bristol School at Brooklands, who all took their *brevets* about a fortnight ago under the tuition of Mr. F. W. Merriam. From left to right, the aviators are: Mr. Julian Hall, Lieut. Crawford Kehrman, Lieut. MacLean, and Mr. Harold Lane.

and Lieut. Bayly. Mr. Gordon Bell also out on the 60-h.p., doing some fine pylon work.

Sunday morning was again fine, and the pupils were out at 7.10. Following a short flight by the chief pilot, Lieut. McMullen went up with 35 Caudron and flew some excellent circuits and figures of eight, showing that he was quite ready to do his *brevet* tests on the next favourable opportunity. Lieut. Bayly and Mr. L. Lawford good circuits on same machine. Lieut. Osborne, R.N., a new pupil, doing straights on the same machine at his first attempt.

In the afternoon Lieut. Spencer-Grey put up a flight of 30 mins. on the little 35 Caudron and gave a splendid exhibition of right and left-banked turns. Mr. Lewis Turner was also out on the same machine later.

**Temple School.**—On Saturday last, Mr. George L. Temple brought out the 35-h.p. Caudron biplane, but owing to engine trouble he did no air work. Next day he was out just before dark on the Caudron, following up on Monday afternoon with several flights on this machine. Several pupils are commencing next week.

## Salisbury Plain.

**Bristol School.**—Wind was blowing fully 35-40 m.p.h. all day Monday, last week, and all attention was confined to the machines in the hangars. On Tuesday the wind of the previous day had not abated, flying was impossible all through the day. Jullerot made the only flight Wednesday, ascending in a 50-h.p. tandem monoplane, but wind was far too bad for pupils.

The wind was blowing a hurricane all day Thursday, but about 5 o'clock in the afternoon it abated considerably, and England was up for a test on an 80-h.p. monoplane, reaching 2,000 ft., and landing with a good spiral. Jullerot was out for a couple of solos on a 50-h.p. Bristol, Pixton making a good flight on an 80-h.p. monoplane.

On Friday the wind was terrific most of the day, but, as on the previous day, the wind ceased considerably about 5 o'clock, and Pixton tested two 80-h.p. Bristol monoplanes with passengers, making excellent flights. Jullerot was up for two trips on a 50-h.p. monoplane. Weather was still too bad for pupils' work.

**Royal Flying Corps.**—Wednesday and Thursday of last week were very misty, and so no good for outdoor work.

Friday was clear but frosty when Lieut. Carmichael on Maurice Farman biplane in a rough wind flew over to the Central Flying School, Upavon, to attend a lecture, returning to Lark Hill at a height of 3,000 ft., he finished with a fine landing. Major Higgins, D.S.O., followed on biplane 203 for a 30 mins. scouting flight.

Saturday, Lieut. Cholmondeley was out on Maurice Farman biplane, scouting around in gusty winds at a height of 1,400 ft., and Major Higgins was on biplane 203 for a 10 mins. trip. Monday and Tuesday, work confined to workshops. The R.F.C. has returned to Bulford Camp from the Cavalry School at Netheravon.

## Upavon (Central Flying School).

**Royal Flying Corps.**—On Tuesday, Wednesday, and Thursday last week the weather was totally unfit for flying. A strong wind was blowing from the N.E. on all three days. On Friday, the wind was strong in the morning, but dropped considerably in the afternoon. On Avro 404, Capt. Fulton, R.F.A., made two flights of 10 mins. each. Lieuts. Marks, Small, and Littleton each flew a circuit of aerodrome on same machine. On Avro 406, Lieut. Holt for two circuits, and Lieuts. Small, Littleton, Warter, and Marks one circuit each. On BE 417, Capt. Salmond made one flight of 7 mins. and one flight of 11 mins. with Lieut. Dawes as passenger. Lieuts. Soames and Bigsworth were doing circuits, being in the air for 20 mins. and 11 mins. respectively. On Maurice Farman 425, Capt. Salmond made one flight of 10 mins., and Lieuts. Boyle, Marix, and Harvey were all flying for 20 mins. each. Lieut. Longmore, R.N., made a short flight on Maurice Farman 403. Capt. Tucker was flying for 10 mins. on Maurice Farman 418, and Lieuts. Glanville and Bowhill were up for a quarter of an hour



Mr. G. Lee Temple, who recently passed for his *brevet* on his Caudron biplane at Hendon. He has opened a school there, where he instructs in monoplanes and biplanes.

each on the same machine. On Short biplane 401 Lieut. Oliver made two flights of 20 mins. and 9 mins. each. On Short biplane 402 Lieut. Roupell made an excellent flight of 40 mins. Major Ashmore flew the Maurice Farman 429 from Farnborough.

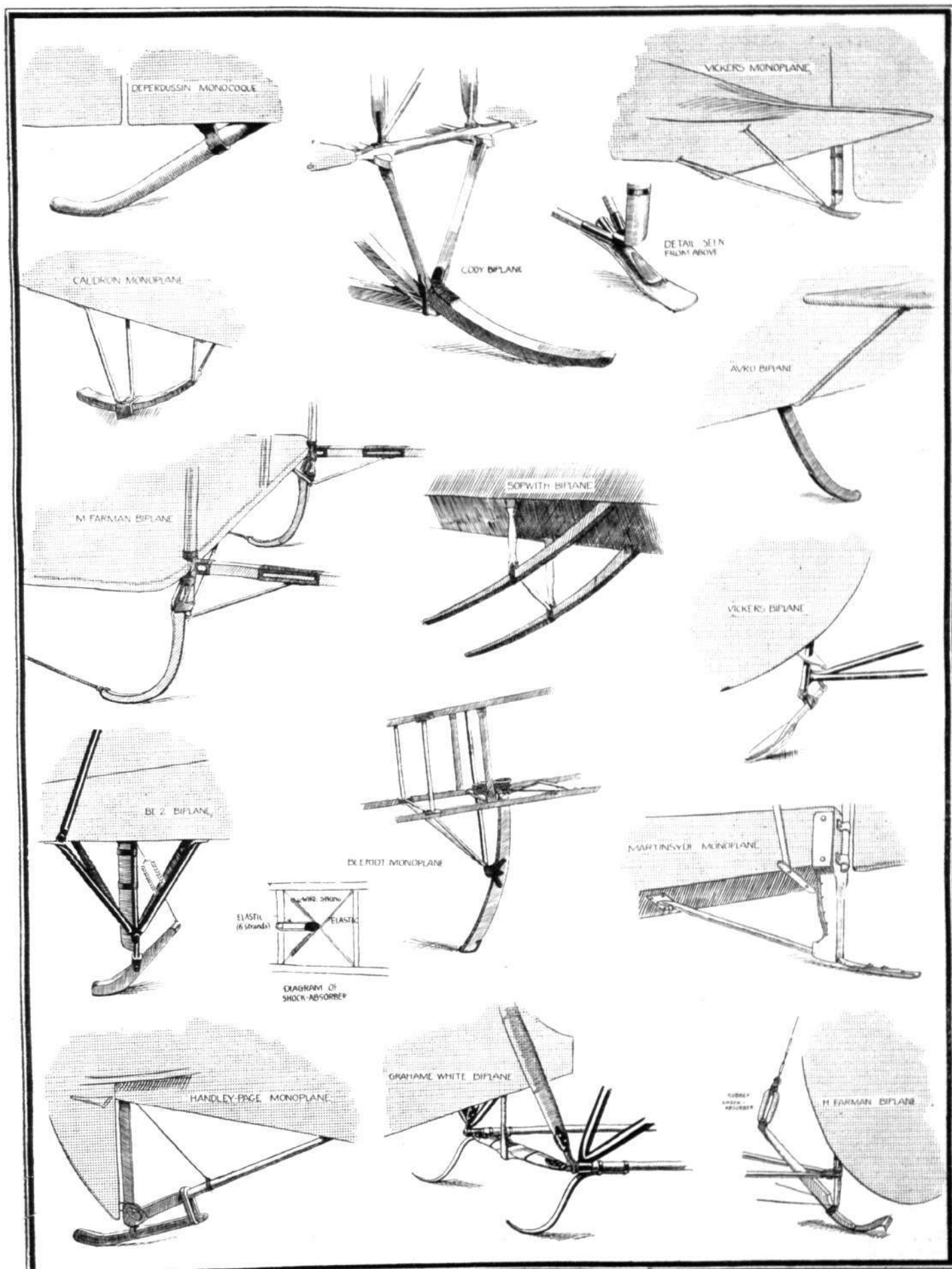
On Saturday a good morning's work was done, all machines trying the air. On Avro 404, Capt. Fulton was flying straights with Air Mechanic Harrison as passenger, Lieut. Small doing circuits, being in the air for 35 mins. Lieuts. Warter, Holt, and Marks were all doing circuits of 10 mins. each. Air Mechanic Higginbottom was flying circuits, with Air Mechanic Harrison as passenger, on Avro 406. Leading Seaman Marchant was receiving instruction from Air Mechanic Higginbottom for 40 mins., and is making good progress. On BE 416, Capt. Salmond made a good flight of 1/2 hr. with Lieut. McDonnell as passenger, and one flight of 5 mins. alone. On BE 417, Lieut. Arthur made a fine flight for 17 mins. at 3,000 ft. Lieuts. Burroughs and Soames were up for circuits 20 mins. each. Lieut. Bigsworth did one circuit of 8 mins. On Maurice Farman 418, Capt. Tucker was doing circuits for 20 mins., and Lieut. Unwin one circuit of 8 mins. On Maurice Farman 411, Lieut. Longmore was giving instruction to Air Mechanic McNamara, Leading Seaman Bateman, and Sergt. Street. On Maurice Farman 425, Capt. Salmond did two circuits of 8 and 5 mins. each. Lieuts. Conran, Boyle, Marix, Ross, Kennedy, and Harvey, all circuits in good style. Air Mechanic Collis circuits for a quarter of an hour on Maurice Farman 403. On Short biplane 401, Lieut. Oliver made two good flights of 13 and 26 mins. each. Lieut. Roupell was doing circuits for 5, 10, and 25 mins. respectively. Major Gerrard arrived from Farnboro' on Short tractor biplane 423. On Monday the wind was too strong for flying, the wind on the ground blowing at 17 miles per hour, but at 1,000 ft. a 44 m.p.h. was in operation.



## THE DUNNE-HUNTINGTON MACHINE IN FLIGHT.

A VERY successful flight has just been accomplished over the Eastchurch ground by Prof. A. K. Huntington, who has been a most persevering experimenter with one of the earlier Dunne aeroplanes, which he has repeatedly modified in the light of experience until it now forms what is in effect a joint design. Prof. Huntington deserves the utmost credit for obtaining a successful issue to his labours, which, although extended over several years, have mainly been limited to week-end visits owing to his duties at King's College, London. Pictures of the Huntington aeroplane may be seen in FLIGHT, April 30th, 1910. The speed is about 43 m.p.h. Recently, Prof. Huntington put a 70-h.p.

Gnome engine into his machine, and after making some further alterations to the back plane he hit upon the right adjustment which enabled the machine to lift easily. Prof. Huntington then made several circular flights and repeated landings in order to see whether it was in proper trim. A further successful flight of about 20 minutes' duration was carried out on the next day, the machine making short turns both to the right and the left within the bounds of the flying grounds. Prof. Huntington, who piloted his own machine, has written to us to say that it is quite steady in flight and very sensitive to control. He considers that as now arranged it should make a very practicable machine for service purposes.



AT OLYMPIA.—A study in tail-skids.

"Flight" Copyright.



## ACCESSORIES AT THE OLYMPIA SHOW.

ALTHOUGH the aero-accessory business relating to aviation has not the same magnitude as that appertaining to motoring, it is slowly, but surely, growing in importance. At the previous Aero Shows, for instance, it is true that there were several accessory firms amongst the exhibitors, but they had few *aero-accessories* on view, whereas at the show just concluded, though the number of firms exhibiting was, perhaps, not very large, there were numerous accessories to be seen really applying to aviation. We have endeavoured to give below a complete *résumé* of the more important exhibits on each stand, supplementary to the review which appeared in our first show number.

### Aeros, Ltd.

Besides a large selection of the orthodox wire strainers, eye bolts, Blériot clamps, eye-plates, aluminium lugs and sockets, and materials, this firm had a few novelties—some quite new—of more than passing interest. The "Total" fire extinguisher is of quite a new type, being just what is wanted for small fire outbreaks in hangars, or with aeroplanes themselves. The extinguishing medium is a patent chemical in the form of a powder, which, on opening a valve, is forced out, like a jet of liquid, by carbonic acid gas. The carbonic acid gas is contained, under pressure, in a steel cylinder attached to the body of the extinguisher, and can be easily renewed, as can also be the powder. The pair of goggles—for attaching to a Warren helmet—is one of several different patterns supplied by this firm. It is made in dark leather, lined with soft fur, and has interchangeable "glasses." The latter can be of various materials and shades, unbreakable, non-inflammable, and also in Chroophyl



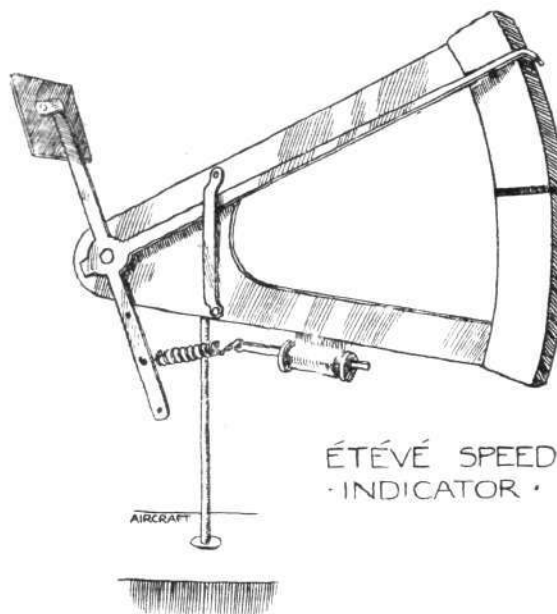
The Aeros "Total" fire-extinguisher.

glass, which enables the wearer to look into a strong light, and therefore suitable for cross-country or over-sea flying during brilliant sunshine. One of the several instruments shown was a new speed indicator, in which accuracy in reading is sought for by the employment of two air-intakes—one on each wing tip. Briefly, the action of this instrument is as follows:—The rush of air, caused by the movement of the machine, passing through the air-scoops, acts upon two compartments or bellows placed one above the other, each connected to an air-intake, and the movement of these bellows is transmitted through gearing to the pointer on the dial. Amongst the articles of clothing specially designed for aviation seen in addition to the above accessories were some smart jerseys, mufflers, jackets, caps, &c., made by the Jaeger Co., Ltd. Lubrication oils formed another important exhibit shown by Aeros, Ltd. These consist of pure hydro-carbon oils, and a pure castor oil for rotary engines. The Admiralty and Army have recently placed an order for this latter oil. The safety of the aviator was catered for by the previously mentioned Warren helmet and the "Boddy" life-saving jacket, a new and improved model of which was exhibited. Both these devices have been fully described in FLIGHT some little time back. We might remind our readers, however, that the former has by now gained a well-deserved popularity whilst the latter has been approved and certified by the Board of Trade. A new tyre-filling, named "Pneumelasticum," which should meet with some success in use on aeroplanes, was also shown. Although certain difficulties may arise with tyre-fillings in connection with automobiles, it must be remembered that the work an aeroplane tyre is called upon to do is not anything like so arduous. Most of these difficulties, therefore, should be absent when applied to the aeroplane tyre.

### Aircraft Manufacturing Co., Ltd.

There were some interesting and important accessories shown on the Aircraft stand, besides the two biplanes and the travelling workshop. These were the Étévé speed indicator, the Behrens Tachymeter, or engine revolution counter, and the Roneophone dictating machine. This latter instrument was, perhaps, the most interesting, and should, we think, be of value for scouting purposes. It consists of a special form of phonograph (Pathe system) by means of which the pilot can dictate a record of his observations as they occur, having at the same time complete control of the machine. These observations are recorded on small discs, similar to those employed with the ordinary talking machines, and can be transcribed immediately after landing, or they could be dropped at some

pre-arranged place, being unbreakable. The Étévé instrument, which we illustrate, does not indicate the actual speed of the aeroplane, but indicates whether or not the machine is flying above or below its normal speed. A pilot can, therefore, keep the speed of his machine more or less constant by observing if the pointer is

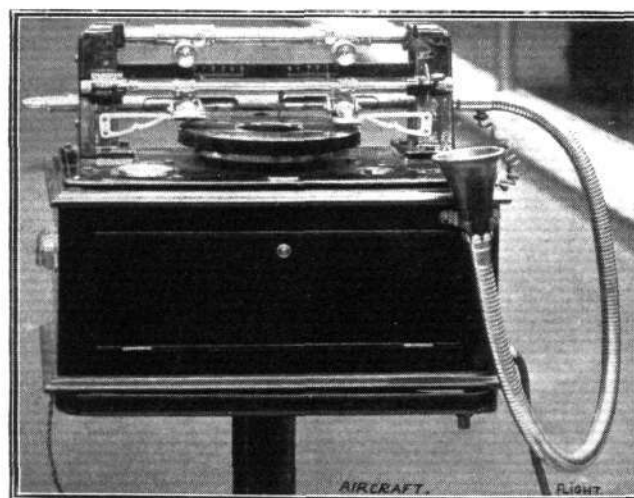


The Aircraft Co.'s Étévé speed-indicator.

on the red mark of the scale and regulating the power of his engine. A few trial flights have to be made before the instrument can be correctly adjusted.

### Avanti Manufacturing Co.

One does not often come across propellers or tractors made out of the solid, the laminated type being almost universal nowadays.



"Flight" Copyright.

The Roneophone, by means of which the pilot is able to dictate a record of his observations whilst controlling the machine.

The above firm, however, exhibited a tractor of the former type which was decidedly interesting. Apart from the fact that this tractor was cut from a solid piece of wood, its chief point of interest was the manner in which it was made—by means of a duplicating machine. This machine, it is claimed, reproduces propellers and tractors from templates or the finished article with a degree of accuracy that cannot be obtained with hand-carved types. Not only is the original faithfully reproduced in any quantities, but tractor shapes can be made from a propeller shape and *vice versa*, and the time taken to duplicate a propeller or tractor is only about 15 hours. The original from which the tractor exhibited was made—a Handley Page 6 ft. 6 in. tractor—was also shown.

**Bowden Wire, Ltd.**

Quite a large variety of fittings used in connection with the Bowden control were shown, including a hand-regulated air inlet, and a carburettor "tickler," both to be operated by the Bowden control from the pilot's seat. The Bowden control, as most of our readers know, consists of a flexible sheathing made of closely-coiled wire, and a wire cable contained within the former. The whole arrangement can be carried round corners and obstacles, and yet allow a perfectly free movement of the inner cable. The carburettor agitator has already met with some considerable success on motor cars. Fitted to an aeroplane engine, it should, we think, be particularly useful. It consists of the usual Bowden mechanism, which operates a plunger that depresses the carburettor-float each time a push-button at the other end of the Bowden wire is pressed.

**British Petroleum Co., Ltd.**

Petrol, even if permitted to be exhibited, is a rather hopeless sort of thing to make an exhibit of. Yet, despite this fact, the "Shell" stand was worth more than a passing glance. The exhibits themselves were both pretty and interesting. They consisted of a large collection of shells (nothing whatever to do with petrol, except in name), a scale model of the Shell ss. tank steamer "Euplectela," a model of one of their drilling rigs and derricks, and many interesting facts and pictures re the production of their famous motor spirit.

**Burroughs Wellcome and Co.**

If this firm could only have exhibited some "Tabloid" petrol they would have had something even more interesting than those remarkable little first-aid outfits which our readers know so well. Besides these outfits, which are particularly suitable for aviation, and measure from 3½ by 3 by ½ ins. upwards, there are the "Tabloid" photographic outfits, also useful in connection with aviation. For military purposes alone, photographs from aircraft bear an important part in scouting and reconnaissance, and if an outfit for producing the finished photographs when required can be carried on the aircraft, well, so much the better.

**Cellon Co.**

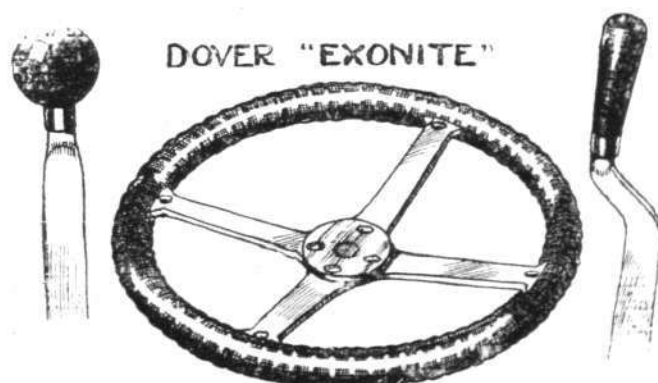
The Cellon stand was an example of how certain articles that do not lend themselves particularly well for exhibition purposes can be made attractive. For there is nothing very striking in sheets of glass-like material, lengths of tubing, and bottles of mysterious-looking liquids. Yet this stand was one of the most attractive displays in the Show. Illuminated panels of "tortoiseshell" Cellon formed the walls of the stand, whilst a number of photographs of the various monoplanes and biplanes that employ Cellon, either as a dope or for windows, were shown. In the former capacity it has met with a considerable amount of success, for it makes the fabric water, air, oil and petrol proof, tightens and adds to the strength of the fabric, and can be supplied in all colours. The transparent sheets are non-inflammable, are remarkably clear, and do not distort the vision. Amongst the users of these sheets may be mentioned the British, Italian, German and Austrian Governments. Some very useful articles made of this material were also shown, all non-inflammable, such as match boxes, cigarette cases and combs.

**W. F. Dennis and Co.**

Cables composed of galvanised piano wire, varying in size from .039 in. in diameter, upwards, formed the exhibit of this firm. These cables are manufactured in Germany, by the Felten and Guillaume Carlswerk Co., of Mülheim, where they have made a name for themselves in aviation and other work. Strength and durability are two of the advantages claimed for this wire.

**Dover, Ltd.**

We give a sketch of three Dover specialties—a control wheel and two control-lever handles. The first of these is made on the same



Dover "Exonite"-covered control wheel and levers.

principle as the well-known automobile steering-wheel of the same make, but is considerably lighter, being made of aluminium and "Exonite," instead of the latter and steel. The "Exonite," with which these wheels are covered, has the appearance of highly-polished ebony, and is not in any way affected by climatic or atmospheric conditions. It retains its lustrous appearance indefinitely, and, combined with the spiral ribbing shown in the sketch, has a very pleasant "feel" or grip. If desired, the arms of the wheel can be covered with "Exonite," as well; while a different style of wheel is also made, in which the rim has a smooth, polished "Exonite" covering, having one side ribbed only. Owing to its lasting properties, "Exonite" is particularly suitable for lever handles, for nothing is more annoying than a split or broken handle on a control lever—and this constantly occurs when the handles are made of wood. We think that it can safely be said that this will not happen with "Exonite" covered handles. The two types shown in our illustration are exceedingly smart in appearance. "Exonite" is also being made in transparent sheets, suitable for use as windows or wind-screens of aeroplanes. As such it has several good points, for example, lightness, non-inflammability, and the fact that it is unbreakable. Many other uses are made of "Exonite," those most applicable to aviation being dopes for fabric, lacquers, and varnishes, while tubes and rods made of this material should also come in useful in aeroplane construction. H.M. Airship "Delta," which was, perhaps, the centre of attraction, was fitted with the Dover "Exonite" control wheel.

**Alfred Dunhill, Ltd.**

A very extensive selection of clothing for aviators, including one or two new articles of a decidedly original character, were to be found on this stand. We refer to a new type of safety helmet which has been designed by Messrs. White and Thompson (who also had one



Dunhill's safety helmets and combination cap and goggles.

of these helmets on their own stand, No. 14), and the combined cap and goggles. As will be seen from the illustration of the helmet, its main feature consists of the neck extension, which is designed to make for greater protection in case of a fall. The lower extremity of this extension is in the form of a steel collar which rests on the shoulder. There are three steel supports for the neck, while the crown of the helmet is also of steel. The whole helmet is covered with leather, and is well padded with felt. The cap is really an excellent idea, for one often sees aviators troubled with their goggles when worn over an ordinary cap—which is done pretty frequently, as there are still some who object to wearing safety helmets. The usual procedure is to pin the goggles on to the cap and keep them there, looking like a pair of eyes at the back of the head. The cap in question, however, looks like an ordinary motor cap, but embodied in the flap at the back is a pair of goggles, so one only has to lower the flap, reverse the cap and the thing is done. Several other kinds of head-gear were displayed on this stand, from which we have selected two other kinds of safety helmets. One of these is a pneumatic model, made of stiffened hide and having a steel plate and air cushion in the crown which deaden the force of a blow or fall. The other helmet—which is the type used by the German army—is made of compressed fibre and is quite weather-proof. A very smart, and at the same time practical, costume for lady aviators was shown. It consists of a short jacket with Raglan sleeves, wrist and neck straps, and a divided skirt, both of which are made of Dunwear waterproof-



material or of leather. The divided skirt can be strapped round the ankles, giving a perfectly free movement when in the aeroplane, whilst when on the ground the skirt has the usual appearance. Amongst the instruments shown were a full range of the Alexander Gross specialities, including the "Anti-drift" compass, bearing finder, aviation maps and map-holders.

## Garuda Propellers.

Garuda propellers and tractors, which are manufactured by Garuda Propeller-Bau, G.M.B.H., Naumburgerstrasse, 42-45, Berlin, Neukolln, are comparatively unknown in this country. They have, nevertheless, achieved numerous successes in their country of origin. Their design is both unusual and interesting, being the result of several years' scientific research. They are of the laminated type, but the blades are bent by a special process, so that the latter slope forwards, *i.e.*, the tips are slightly in advance of the boss. This dihedral setting of the blades has the following effect:—Owing to the centrifugal force of the blade tips, a tendency on the part of the latter to "flatten out" is produced, which is not only resisted by the natural "spring" of the blades, but by the thrust of the blades as well. In this manner, it is claimed, propeller flutter is entirely eliminated.

## General Aviation Contractors, Ltd.

We do not think there were many accessories of any importance that could not be found on this firm's stand, which, by the way, was most tastefully arranged. It is not proposed, therefore, to give an account of all articles seen, but to describe a few of the most interesting, some of which are included in the accompanying illustrations. The "Roold" specialities consist of the safety helmet, of which

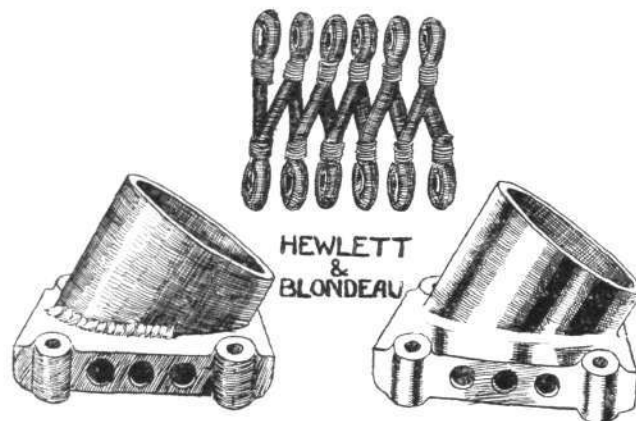
there are several varieties (the latest pattern, with neck protector, is shown in our sketch), "pilot caps" in leather and wool, suits in leather, "papier du japon" (an exceedingly light rubber-like material) and "papier kani," chest and leg protectors, safety belts, the "Audiphone" speaking tube attachment to helmets, and map cases. A new safety jacket was also shown, which will keep an aviator afloat should he fall into the water. It is in the form of a waistcoat and has an inner lining of a felt-like cork composition. The G.A.C. fleece-lined black leather combination suits struck us as being of exceptionally good value for the price charged. Instruments were represented by the Hue altimeters, barographs, and watches. We give an illustration of one of the latest models of altimeters, which only came over from France during the Show. It is exceedingly small, and can be strapped on to one's arm.

Another article that made its first appearance during the show is the G.W.T. engine starter, which we hope to describe in detail on another occasion. The "Monodep" compass and the "G.A.C." watches are also important accessories, the former enabling one to keep a correct course by observing the movement of two pointers on the compass. Although hardly to be considered as accessories, the "Tellier" floats were there just the same, their construction and design being exceptionally good. Specimens of "Emaillite" dope were shown as well as the successful "Gnomol" castor oil. The former is obtainable in various colours, which, we are told, will not run. Last, but by no means least, are the Rapid propellers. The success achieved by these propellers at home and abroad renders it unnecessary for us to deal at any length with them here, suffice it to say that the latest pattern is particularly suitable for use on hydro-aeroplanes, as the tips are reinforced by a covering of copper. Breakage due to contact with the water whilst revolving is thus minimised.

## Hewlett and Blondeau.

Some very fine examples of oxy-acetylene welding executed by this firm were displayed on their stand. Not only are the joints clean and well moulded, but, judging from an inspection of a scrapped socket which had been cut in half, they are perfectly homogeneous. But, as an example showing the various uses to

which this form of welding can be put, one could not do better than examine the control-lever shown on this stand. Practically speaking, it was built up of numerous parts welded together—and so welded that it was difficult to see where one part ended and another began. One point in favour of this welding is that extra strength is given to the joint, owing to the additional metal at this part necessary in the welding process. This is clearly shown by one of our sketches showing one of the previously mentioned sockets



Hewlett and Blondeau's welded steel sockets, and elastic shock absorbers.

before the blow-pipe is applied, and another sketch showing the finished job. It will be seen that little bits of metal are placed along the join, which, when a part of the adjoining metal after the application of the blow-lamp, forms an extra wall of metal all around the joint. The welded-tube work, *fuselage*, &c., done by this firm is equally good, if not even more meritorious, considering the greater difficulties met with in connection with tubular work. In addition to the welded work, a large selection of smaller, but equally important, fittings, such as eyebolts, wirestrainers, angle plates, &c., were shown, while tanks and engine-plates (also bearing specimens of welding) formed two other specialities of this firm. Instruments formed a part of the display, and included an interesting type of engine-revolution counter and an inclinometer. The latter instrument has the advantage of being able to be fitted in an upright position, thus avoiding the necessity of looking downwards to ascertain the machine's attitude, as is the case with some types.

## Hoyt Metal Co., Ltd.

Stacks of what appeared to a youthful visitor to be bars of chocolate wrapped up in silver paper formed the exhibit of this firm. Hoyt metal is a carefully prepared babbit metal having high anti-friction qualities that has given every success in bearings for internal-combustion motors. Numerous examples of die-cast bearings made from this metal were also shown. These bearings are produced by a special pressure and vacuum system perfected by this firm, and are guaranteed true to .001 in. They require no machinery of any description, and are ready for fitting in their housings.

## Integral Propeller Co., Ltd.

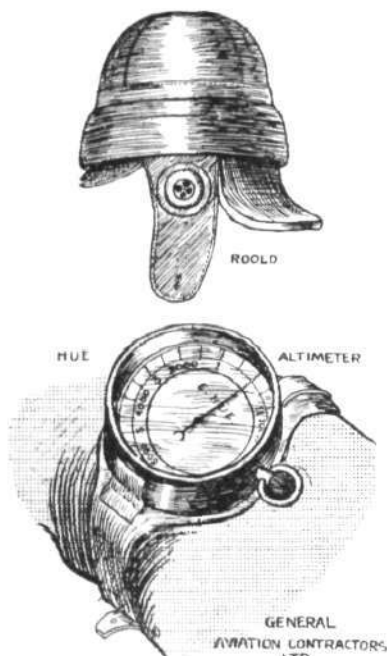
Few propellers can claim so many successes as can the Integral, or, as it is better known this side, the "Chauvière." One of the earliest in the field of aviation, its characteristic rounded blades are now familiar in all parts of the world where aircraft exist. And its reputation is well deserved, for, as any who examined these propellers exhibited at the Show could see for themselves, the design and workmanship leave little to be desired. A conclusive demonstration of their soundness in construction was the placing of one of the "hydro" models in a glass tank of water, a procedure which did not show any deleterious effect on the propeller. The latest Chauvière propeller for hydro-aeroplane work has half its blades sheathed with copper, so as to withstand the action of waves or spray. Various sizes of these propellers were shown as well as some beautifully made model propellers.

## A. Marquer.

Besides some "helicopting" butterflies, which were really very fascinating to watch, and various types of "Al-Ma" model aeroplanes, an ingenious automatic spanner was shown. The "Plattina" spanner or grip is of the self-adjusting type, and the range in sizes of nuts and tubes which can be operated upon with one tool is remarkable.

## Richard Melhuish, Ltd.

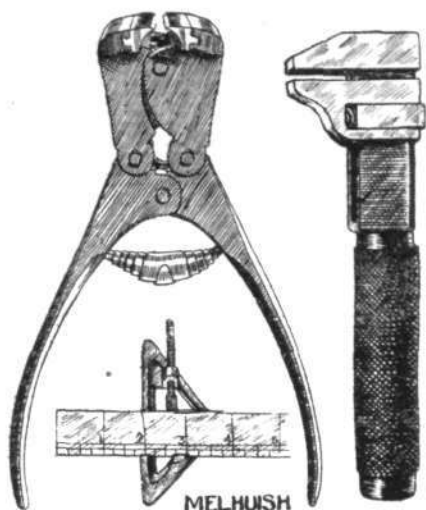
The most comprehensive exhibit in the Show was undoubtedly Richard Melhuish's display of machinery and tools. Apart from the actual construction of aeroplanes, the repairs and upkeep alone



Two G.A.C. exhibits—the Roold helmet and the latest Hue altimeter.



call for careful consideration in the equipment of a workshop. In fact the successful running of an aeroplane, whether for military, exhibition, or school work depends very largely on the ability to effect quick and sound repairs, alterations, &c. Everything necessary for fitting up such a workshop to meet the above requirements was shown by this firm. It would be quite impossible to describe, or give a list even of, all these machines and tools, in the short space we have at our disposal. A remarkably powerful wire bender and cutter is illustrated in one of the accompanying sketches, along with a quick-adjusting spanner, and a useful rule-gauge. The very complete catalogue

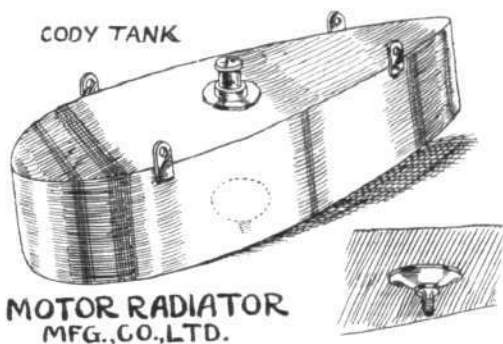


**MELHUSH**  
Melhuish steel-wire cutters, quick adjusting spanner, and rule angle-gauge.

of all their machines and tools is a revelation, and we strongly advise any of our readers interested in this matter to apply for one of them.

#### Motor Radiator Manufacturing Co.

Two types of aeroplane and airship radiators were shown by this company—the well-known Zimmermann honey-comb, which has been considerably improved constructionally, and a flat-tube type. This latter type of radiator is made up of a number of solid drawn brass tubes, stream-lined in section and of remarkable strength and lightness. The Zimmermann radiator has been described before in these columns from time to time, so only a brief explanation of its construction is necessary at the present moment. It is a honey-comb pure and simple, being built up of layers of exceedingly thin, circular brass tubes having a narrow water space between them. This water space is obtained by expanding the ends of the tubes, so that each tube is separated from the other when stacked together. The ends of the tubes are soldered together by a special process, thus forming a wall at each end of the stack of tubes. Some neat



**CODY TANK**  
**MOTOR RADIATOR MFG. CO., LTD.**  
The Motor Radiator Manufacturing Co.'s stream-line tank, designed for Col. Cody.

stream-lined tanks were also shown, one of which—built to the order of Col. Cody—we show in the accompanying sketch. Another neat piece of work, also for Col. Cody, was a combined tank and radiator, the tank being stream-line in form and, of course, at the top of the radiator.

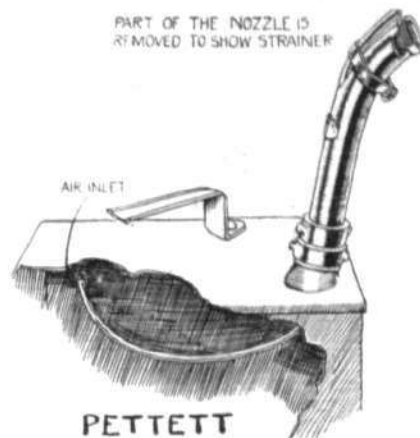
#### Navaltum, Ltd.

The metal bearing the above name was one of the most interesting exhibits in the Show, for many have been the attempts to produce a metal having the lightness of aluminium but with a higher tensile strength and freedom from atmospheric attack. Although these attempts have met with more or less success, certain drawbacks still remained to be overcome. Foremost amongst these were the difficulty of obtaining perfect castings and a slight susceptibility to corrosion—this latter point being much less in evidence in the alloys of aluminium than with that metal itself. Special interest attached itself to this new aluminium alloy, Navaltum, for the makers claim that these two drawbacks have been entirely eliminated. Navaltum

has a specific gravity varying from 2.2 to 2.8, and a tensile strength of from 9 up to 25 tons, according to the different grades. The castings are clean and have stood tests up to a tensile strength of 14 tons per sq. in., whilst the drawn bars have a tensile strength of 14 tons per sq. in. Having merits such as those given above, Navaltum should receive the most careful trials by all users of the heavier metals such as copper, brass, gunmetal, &c., with which it compares very favourably, and has, we understand, already displaced in certain Government work.

#### Pettett's Patent Safety Filler Co.

Filling up the petrol tank, as many of our readers must have realised before now, is not without its inconveniences. The funnel, when used, is a clumsy affair at all times, and has a peculiar knack of wobbling over to one side of the tank away from the mouth of the can, so that no small amount of petrol is wasted. When the job is done—and this generally takes some time—the funnel is more often than not thrown on the ground—to collect various particles of "foreign matter." We made a close inspection of the device shown by William Pettett (illustrated by one of the accompanying sketches) which does away with the above troubles. It consists of a neck or spout, of convenient length, which screws on to the mouth of the can; any size of can may be so fitted by the use of various adapters. This neck not only makes it easy to pour into a tank, however awkwardly placed, but the petrol can is emptied in half the time it takes in the ordinary way. We saw an actual demonstration of this with water, and timed the emptying of a two-gallon can, with and without the filler. In the first case, the can was emptied in 20 secs., without any mess; the second trial, with the filler removed, took 40 secs., and was accompanied by the usual splashing. Another feature of this device is that, as soon as the level in the tank being filled reaches the nozzle of the filler, all flow ceases owing to the air-lock produced. A very fine filter is fitted to the nozzle of the spout, so that no water or dirt should enter the tank with the petrol.



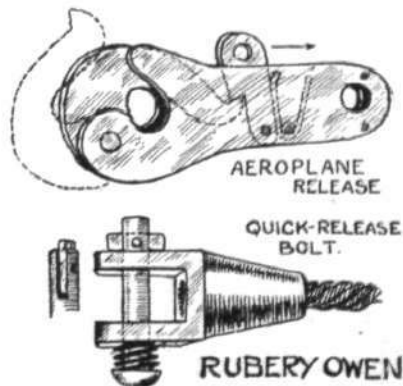
**PETTETT**  
The Pettett safety filler fitted to ordinary petrol tin.

#### Ruberoid Co., Ltd.

Nothing further can be added to our remarks on this firm's exhibit, made in our first Show number, other than with its 21 years of successful application as a roofing material, and the fact that it is waterproof, unaffected by weather or time, and is flexible, we see no reason why it should not be universally employed for hangars, airship sheds, &c.

#### Rubery Owen and Co.

The special feature of this firm's exhibit was the variety of welded steel work used in the construction of aircraft. The pressed and welded steel engine housings and supports—designed for well-known makes of aeroplanes—were excellent examples of the work turned out by this firm. Other notable examples were some specimens of solid, cold drawn steel tubes, bent and welded together at different angles. The bends of these tubes were made by a special machine, which maintains the true circular section of the tube throughout. Eye-bolts, cable-ends, and wire-strainers made from high tensile steel, nickel steel, and chrome vanadium steel, also formed special features of this firm's exhibit. Two other specialities, illustrated herewith, consisted of a quick release bolt, and an aeroplane release gear, which has been actually used with great success. The action of both these devices is clearly seen in the illustrations. Numerous



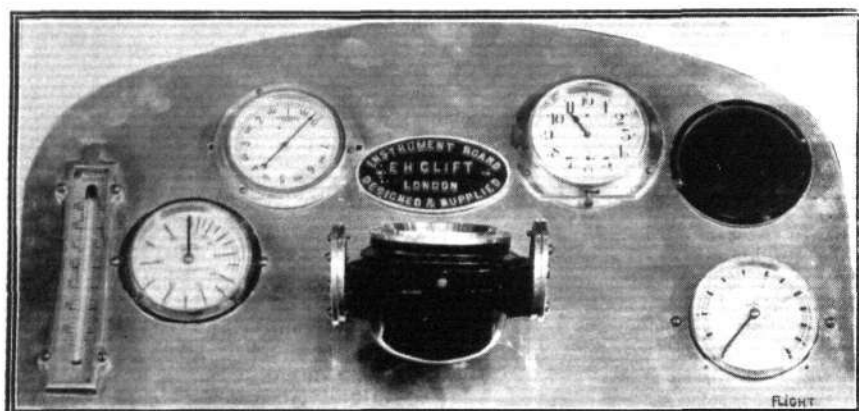
**RUBERY OWEN**  
Rubery Owen aeroplane release device and a simple quick-release bolt.

patterns of steel angle-plates form another very important constructional detail provided by the firm, while almost any shape of solid, cold drawn steel tubes, such as could be used for struts, can be supplied, a selection of which was also shown. The Fox wire bending tool, which has been described before in the columns of FLIGHT, concludes our incomplete list of the large stock of useful accessories that were exhibited on this stand.

## S. Smith and Son.

This well-known firm of watch and speedometer fame had quite a number of useful instruments that few aircraft can do without. Of these, the engine revolution indicator is, perhaps, the most used, and of primary importance. Various models are manufactured, one of a specially light type having an aluminium casing. The method of driving varies, of course, according to the type of motor employed, and the speed of either the motor or propeller—in some cases, even, twin-propellers—can be indicated from 300 to 1,500 r.p.m. There is also a special model which records only the highest speed. Another useful Smith instrument is the "Time of trip" watch. Besides being a reliable 8-day clock, a smaller dial records the time taken for any particular trip. A small knob at the bottom of the instrument sets the hands back to zero. Compasses especially suitable for aeronautical purposes form another important line in aero-instruments turned out by this firm. One type is a luminous, liquid compass, and is most useful for night work. It is

the "short hand" of which forms a segment having a scale engraved on it as shown, and on the top of the rule is an adjustable pointer. In order to find one's true course between one place and another, it is only necessary first to adjust the pointer to a division on the last mentioned scale, which represents the magnetic difference from true north, varying in different parts of the globe, and then to place the square sheet on the map so that the centre coincides with the starting point, and the horizontal and vertical lines coincide with the latitude and longitude of the map. If the rule is then placed so that it connects the point of destination with the starting point, the true course will be indicated by the pointer on the graduated circle. A new type of speed indicator, also designed by Mr. Clift, was demonstrated on Messrs. Smith and Son's stand, and we hope to give a detailed description of this apparatus very shortly. One of the most interesting exhibits on this stand, however, was the new "Goldenlyte" searchlight, of which we give a sketch, showing very clearly the method by which free

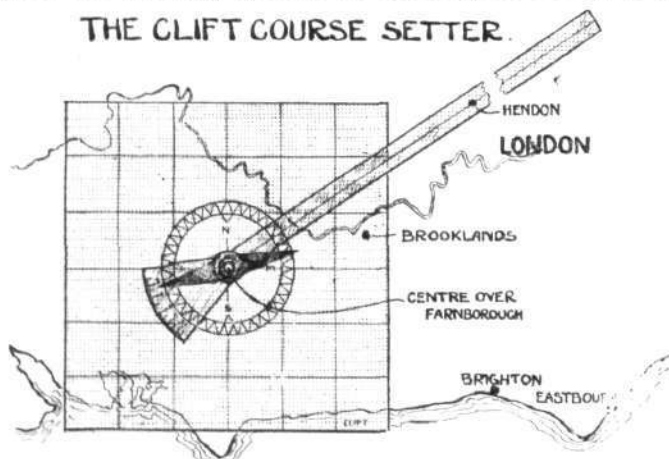


"Flight" Copyright.

One of the Clift instrument boards seen fitted to many of the machines at the Show.

or the most part made of aluminium, and has a floating needle with a luminous "N" end; the cardinal points are marked in black on the glass. The outside box is made in two pieces, so that the compass-box can be turned until the required bearing coincides with the director. An exceedingly ingenious device, by means of which one can easily ascertain the true magnetic bearings of a

## THE CLIFT COURSE SETTER.



The Clift Course Setter.

cross-country course, was shown on this stand. The Clift Course Setter, as it is called, is very simple to use, and the accompanying diagrammatic sketch should make its *modus operandi* quite clear. It consists of three parts: a transparent square sheet having engraved on it a circle bearing the compass divisions in degrees; it also has horizontal and vertical lines marked across it. Pivoted from the centre of the graduated circle is a long transparent rule,

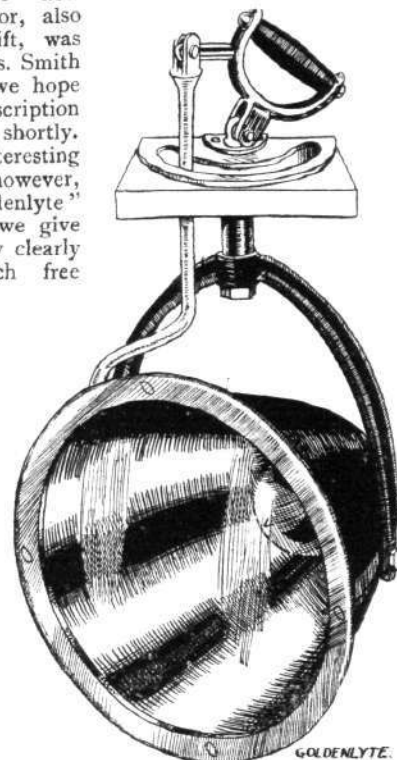
movements of a considerable range, both horizontally and vertically, are obtained. The lamp has a parabolic "Goldenlyte" reflector and a 200 c.p. lamp; current is supplied by a 25 volt. 15 amp. battery (accumulators) weighing 19 lbs. It is claimed by the makers that an object 3 ft. sq. can be lit up from a height or distance of 2,000 ft. A special aviation model of the Smith carburettor, the greater part of which is made of aluminium, was shown in addition to the foregoing accessories. This carburettor is of the multiple jet type, having four jets and choke tubes, and is entirely automatic in its action. In starting, one jet is brought into action, and as the throttle is opened and the suction increases, so the second, third, and forth jets are gradually brought into operation.

## Spiral Tube and Components Co.

When S. F. Cody made his record cross-country flight during September, 1909, he used a Spiral Tube radiator, and from thence onwards these radiators made a name for themselves, which they still retain to-day. W. G. Hawker used a spiral tube radiator on the Sopwith-Wright with which he won the Michelin duration prize last year, and these radiators had already seen 2½ years' service. H.M. airship "Delta," as some of our readers may have noticed, was fitted with this make of radiator, as was also the Dennis motor workshop shown by the Aircraft Co. The constructional features of this radiator are as follows. It is built up of a series of solid-drawn tubes, fixed top and bottom into headers or tanks. Each tube has a corrugated ribbon wound edgewise around it in the form of a spiral. An exceedingly strong job is thus made in spite of the thinness of the tubes and ribbon. Stream-line tanks are another speciality of this firm, and several types were shown.

## Vickers, Ltd.

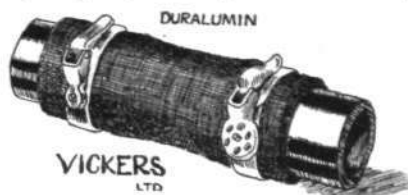
Several examples of the work that can be turned out made from Duralumin, a very remarkable metal, were shown on Messrs. Vickers' stand. Duralumin, which has been on the market for some time now, is a 90 per cent. aluminium alloy, having a specific gravity of 2.8, and a melting point of 650° C. It has the strength



S. Smith and Son's "Goldenlyte" searchlight for aeroplanes.

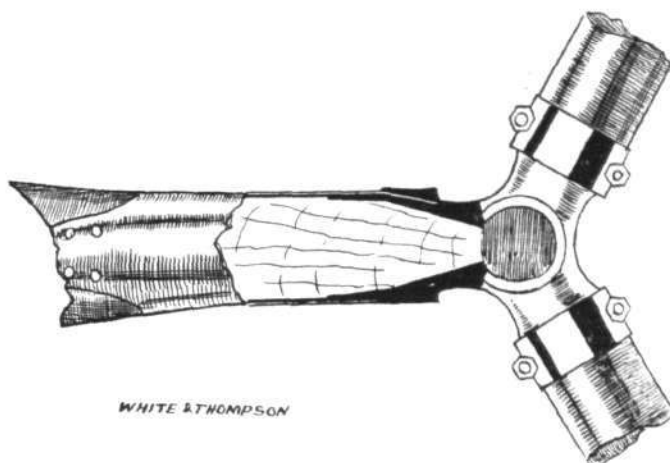


and hardness of mild steel, the tensile strength varying between 25 and 35 tons per sq. in., according to the different grades. The



Vickers "Duralumin" pipe-joint.

principal forms of Duralumin are forgings, stampings, channels, tubes, strips, wire and sheets. To show the ease with which this metal can be worked, some samples of screw-cutting were shown amongst the various other forms of work.



The variable-pitch propeller (3-bladed) designed by Messrs. White and Thompson.

White and Thompson, Ltd.

Two very interesting exhibits were to be seen on this stand—a three-bladed, adjustable pitch propeller, and an elastic or rubber shock absorber of unusual design. The chief feature of the former

## A YACHTMAN'S POINT OF VIEW.

IN our contemporary, the *Yachtsman*, there is an interesting commentary on the Olympia Aero Show that opens a somewhat sweeping criticism of aeroplane construction in general, delivered, of course, from the boat-builder's point of view.

Here is what our contemporary has to say on the subject of cables:—

"We must draw attention to one or two points that strike us forcibly, one of these being the lack of properly spliced eyes in the wire ropes employed in many machines. Of all the machines shown with ordinary stranded wire rope used for stays or controls, not more than two or three have the splices properly made—our fashion! The others use all sorts of schemes to avoid having to employ a rigger or a man who can make a wire splice—the ends may be turned back, seized with wire, and soldered; they may be fitted with bolted clamps; they may be inserted into a socket and run in solid with solder, *à la* Bowden; or the ends may be turned back through a flattened tubular socket, with a couple of bolts and plenty of solder. Many of the eyes shown must have taken the better part of a quarter pound of solder! Not only is a soldered arrangement like this bodgy-looking and heavy, and no stronger than a proper splice, but it must cost about as much to fit; so that there does not seem to be a single argument in its favour.

"There is another point in connection with the wire rigging work that cannot fail to be noticeable to a yachting man—that is, the duplication of control, and, in some instances, stay wires. We believe the occurrence of more than one accident through breakage of a rudder control or warping connection led builders to fit these wires in duplicate, with the idea that breakage of one part does not necessarily mean an accident. This is just about analogous to the fitting of shrouds and halyards in duplicate, instead of fitting only one set of proper and sufficient strength to begin with. And now comes the foolish part of this idea—in many cases the duplicate wires are attached to the same eyebolt or other fitting, so that the duplication is only of what is likely (with properly fitted and suitably selected wire ropes) to be the most reliable item of the

is, that a combination of wood and steel is employed, for form and strength, respectively. Over the shank of the wooden blade is a hollow steel stem having two long extensions, which are let in flush to the front and back of the wooden blade. The strips are riveted together all along the blade by iron rivets through the wood. The boss and blade sockets are of one piece, machined from high-quality steel. The extremities of the tubular blade stems have "V" slots at regular intervals. To fix a blade in the boss, the slotted portions are carefully set down with a hammer over the external covered surface of the socket, while the conical end of the wood shank fits close into the tapered hole; the blade is secured in position by a split collar, tapered to fit the exterior of the socket. The blades are thus adjustable in pitch and can easily be renewed, whilst a propeller can be designed for any number of blades. The shock absorber, which is designed by Mr. F. W. Lancaster, is peculiar in that the rubber is in shear instead of in tension, as is generally the case. This absorber can be described as a broad chain, the links of which are connected together by rubber pins, so that when a pull is exerted, the links tend to shear their "pins." We understand that this unusual form of shock absorber has given good results in practice.

## Lubrication.

Although a highly important question, lubrication does not lend itself very well for exhibition purposes. Nevertheless, four firms represented this necessary accessory at Olympia. These were Messrs. Price's Patent Candle Co., Ltd., Stern-Sonneborn Oil Co., Ltd., Vacuum Oil Co., Ltd., and C. C. Wakefield and Co. We would refer our readers to the report in our first show number for further particulars of these firms' exhibits, as we do not think that anything of instructive interest can be added to what we have already given. We might mention, however, that an interesting oil-testing machine was shown in operation on the Stern-Sonneborn stand.

## Timber for Aircraft.

The selection of suitable timber for the construction of aircraft is a point that cannot be too strongly emphasised. The question of safety is not the only one involved, for the different weights of the various kinds of woods give rise to no small amount of investigation when designing a machine, and the right wood *must* be used in the right place. This important "accessory" of timber was well represented at the Show by the presence of two of the best-known specialists in timber in this country, viz., William Mallinson and Sons, Ltd., and Joseph Owen and Sons, Ltd. On these two stands one could inspect the various woods used for aviation purposes, and also some finished articles, such as skids, propellers, &c.

whole job! We all know that a first-class wire rope may be absolutely relied on every time, and that it is simply a matter of using a proper size, and fitting it properly with good splices and thimbles, large sheaves, and fair leads on and off them. We would undertake to improve the wire staywork of almost every machine in the show, and without more than a fractional increase in cost—if any increase at all. And it must not be overlooked that these machines are constantly under inspection, and that there need never be any question of impossibility to renew a worn piece of gear at short notice, as there may be in a sea-going vessel."

## THE ROYAL FLYING CORPS.

THE following appointment was announced by the Admiralty on the 19th ult.:—

Capt. G. W. Vivian, to the "President," additional, for Air Service, to date February 18th.

The following appointment was announced by the Admiralty on the 20th ult.:—

James Lindsay Travers appointed Sub-Lieut. in the R.N.R., with seniority of February 19th, and to "Actæon," additional, as Flying Officer, Naval Wing, Royal Flying Corps, to date February 19th.

The following appointment was announced in the *London Gazette* of the 21st ult.:—

R.F.C., Military Wing.—Second Lieut. Vivian H. N. Wadham, 5th Battalion the King's Royal Rifle Corps, to be a Flying Officer, and to be seconded. Dated December 5th, 1912.

The following appointments were announced in the *London Gazette* of the 25th ult.:—

R.F.C., Military Wing.—Special Reserve of Officers.—Second Lieut. (on probation) Thomas O'B. Hubbard is confirmed in his rank.

The undermentioned to be Second Lieuts. (on probation). Dated February 26th, 1913: Gordon Noel Humphreys, Norman Channing Spratt, Denys Charles Ware, and Joseph Joel Hammond.



## A SILHOUETTE COMPARISON.

IN the weekly periodicals there is often to be seen a comparison of the strengths of the navies of the world, and it is usual to find the British navy portrayed by a diagrammatic ship that bears a healthily large appearance when compared with the corresponding figures for other countries.

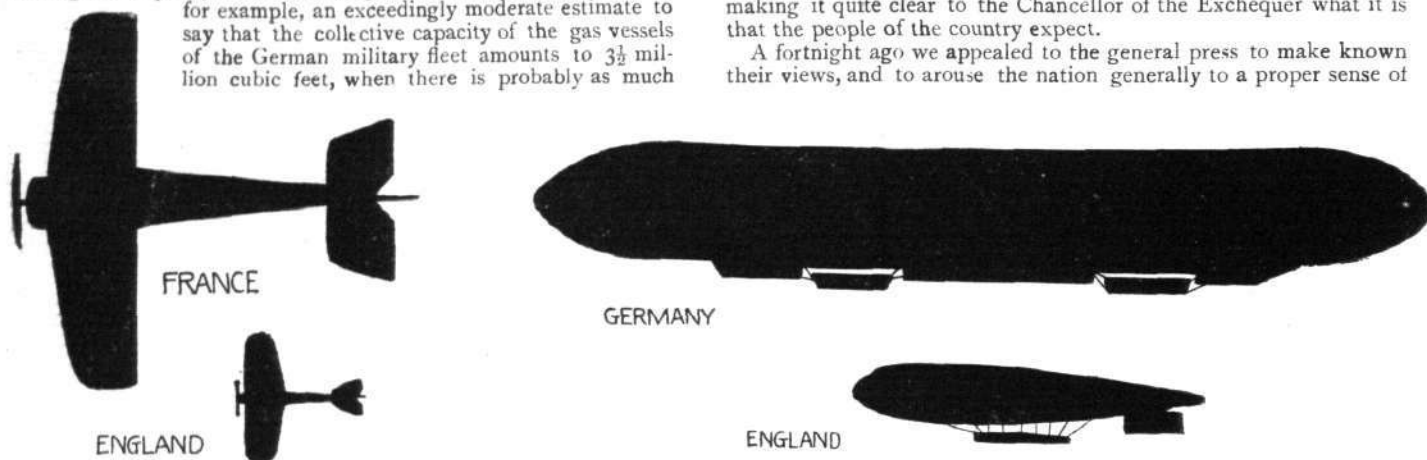
Lest words should have failed to convey the inadequate development of our aerial forces, we present a silhouette comparison that may assist all readers of *FLIGHT* to appreciate why it is that we and all thinking people have been urging the inclusion of a vote of at least a million pounds for aeronautics in the ensuing estimates.

We have no fear of anyone accusing us of attempting to scare the public by an exaggerated ratio in our silhouettes, but we have no doubt that many readers of *FLIGHT* will be able to find reason for making the disparity in size still larger than is here shown. It is, for example, an exceedingly moderate estimate to say that the collective capacity of the gas vessels of the German military fleet amounts to  $3\frac{1}{2}$  million cubic feet, when there is probably as much

a practical way its real appreciation of the importance of an adequate air force for England. This appreciation members of the Government have often enough professed. Past policy has been to go slow, on the principle that there was plenty of time, and that it would be profitable to learn from the experience of others.

International developments of late, coupled with the phenomenal expansion of the aerial forces of Germany and France, demonstrate beyond question that there is no time to spare whatever. This has been apparent for some while, but inasmuch as the only solution to the situation is to be obtained by an adequate money vote, it has been necessary to await the season when the country's finance is on the *tapis*. Some time in March we shall doubtless be made acquainted with what the Government intend to do in the matter. Between now and then there must be no loss of opportunity in making it quite clear to the Chancellor of the Exchequer what it is that the people of the country expect.

A fortnight ago we appealed to the general press to make known their views, and to arouse the nation generally to a proper sense of



A graphic comparison between British service aeroplanes and those of France, and British dirigibles and those of Germany.

again that could be brought into the field in the emergency of war. If war were declared to-morrow, H.M. Airship "Delta," which recently graced the main aisle at Olympia, and has a capacity of about 180,000 cubic feet, would practically be this nation's flagship and dirigible fleet combined, as the Beta and Gamma together only account for about 90,000 cubic feet. Turning to France, which has an air-ship fleet considerably less than that of Germany, there is also to be considered the relative number of aeroplanes. If England at this moment be supposed to possess 100 efficient machines, and it is a very recent supposition at that, then we may easily place the military equipment of France at six times that number.

When the ratios are so great as at present exist, precise figures are of small consequence compared with the recognition of the outstanding disparity in strength. The moral is obvious: we must be as supreme in the air as we are, and hope always to be, at sea, and we must lose no time in the preparation. Rapid development costs money, and now is the opportunity to insist that that money shall be forthcoming. It is at the time of the Estimates for the ensuing year when the Government is best in a position to demonstrate in

the position. The response was immediate and to the point. From all quarters the Government has been told that an adequate policy in respect to aerial armament is expected at the next Estimates, which policy is, for the moment, best summed up in the provision of a vote of at least one million pounds for development during the next twelvemonth.

Unless we spend as much money as other countries, we cannot hold a similarly strong position; indeed, it is probable that we must spend more to get the same effect. Developments in France and Germany have been rapid, but not so rapid as they will be, for they have already spent years in laying the foundations of a thorough experience which is not to be bought offhand by the mere payment of money. While we cannot buy offhand the experience of others, we can accelerate the rapidity of our own developments by having available unstinted financial resources; and, for the moment, that is without question the policy that the Government should adopt. The nucleus of an exceedingly efficient and thoroughly keen executive already exists; the point that is of real consequence is, that it should be properly backed up by Parliament.

## THE R.F.C. MIGRATION TO SCOTLAND.

UP to the time of going to press with our last issue three of the Army aviators taking part in the flight to Scotland had got as far as Banbury, while Capt. Becke had reached Towcester. On the 19th ult. Capt. Longcroft and Lieut. Herbert also got that far, while Capt. Dawes descended about two miles short of Towcester on account of engine trouble. Lieut. Waldron also had trouble with his motor, and finished at Bicester. The next day, Capt. Becke and Longcroft and Lieut. Herbert went on to Kelham, near Newark, while Lieut. Waldron progressed as far as Towcester, where Capt. Dawes was engaged in repairing his machine. On the 21st ult., Lieut. Waldron went on to Newark, and after a brief stop to replenish his petrol tank, &c., continued his journey to York. He was closely followed by Lieut. Herbert and Capt. Longcroft, while on the arrival of Capt. Dawes at Newark later in the day, Capt. Becke also started away for York. When nearing Doncaster, however, he had serious trouble with his engine and had to land. Capt. Dawes in stopping at Newark slightly damaged the chassis of the machine, and so had to stay there for repairs.

Saturday saw three of the pilots, Capt. Longcroft and Lieuts. Waldron and Herbert arriving at Newcastle-on-Tyne, but they found some difficulty in locating their destination on account of the thick fog. Capt. Longcroft went about 15 miles north of the city, and then had to land to find his direction, while Lieut. Herbert had to

descend twice. Lieut. Waldron landed with the idea of discovering his whereabouts at Benwell, to the west of Newcastle, and a mishap to the elevating gear prevented him finishing the three or four miles to Gosforth Park. Capt. Dawes started from Newark, but had to land after covering eight miles. A second descent was necessary three miles further on, while he finally landed twenty miles south of York. Capt. Becke on Monday having had a new engine fitted to his machine, moved from York to Newcastle, and arrived about twenty minutes after Capt. Dawes, who had had to come down once to find his way. Capt. Becke, however, found the fog very troublesome, and had to come down five times before reaching Gosforth Park.

Tuesday saw Capt. Longcroft, Dawes and Becke, and Lieut. Herbert completing the fifth stage from Newcastle to Edinburgh, the landing in each case being effected near the Retford Barracks. Lieut. Waldron started on this stage but was stopped by engine trouble at Stamford Bridge about 28 miles south of Berwick. After adjustments he started again during the afternoon and reached Berwick. On Wednesday he got away early and flew straight through to Montrose and was in fact the first to arrive there. After an interval Capt. Becke, Dawes and Longcroft arrived and were duly received by the Provost and Corporation, while Lieut. Herbert completed the journey during the afternoon.

# BRITISH NOTES OF THE WEEK.

## British Team for Gordon-Bennett Race.

ENTRIES for the British team for the Gordon-Bennett aviation competition, which will this year be held at Betheny, near Rheims, on September 27th, closed on Tuesday. It was announced by the Royal Aero Club that Mr. Gustav Hamel, Mr. James Valentine, and the British and Colonial Aeroplane Co. had each nominated one machine.

## Funeral of Mr. Macdonald.

ON Wednesday of last week, the Thames gave up the body of Mr. Leslie Macdonald, who was drowned in the accident on January 12th, and the remains were taken from Gravesend to Bristol in a motor funeral car on Sunday last. The funeral took place at Canford Cemetery, Bristol, on Monday, and besides the relatives and friends was attended by representatives of Vickers, Ltd., and the British and Colonial Aeroplane Co. All the mourners were conveyed to the cemetery in motor landaulettes, which, with the motor funeral car, were provided by the Bristol Tramways and Carriage Co.

At the inquest held at Gravesend on the 21st ult., a verdict of accidentally drowned was returned. According to the expert evidence it appeared probable that the accident was caused by the lubricating oil freezing, and so leading to the seizing up of the engine.

## Flying from Paris to London.

A FINE flight from Paris to London was made by Brindejone des Moulinais on his Morane-Saulnier monoplane on Tuesday. Leaving Villacoublay at a quarter-past nine, a direct course was made for Calais, where a landing was effected at ten minutes to eleven. After an hour's rest, Brindejone restarted, and in a few minutes had crossed the Channel. Making his way over Canterbury the pilot reached the Thames and followed the river to Barking, where he commenced to skirt London on the north-east side. Several times he was hindered by fog, and eventually landed between Edmonton and Finchley to inquire the way to Hendon. After twenty minutes' delay he continued his journey, safely reaching the Hendon aerodrome at 1.55 p.m., his total time for the trip being 4 hrs. 40 mins. Brindejone des Moulinais says that he realised that he was approaching the Metropolis by the unpleasant smell of smoke which reached him when he was 3,000 feet up.

## Flying from Germany to London.

ON Sunday morning the conditions seemed favourable for Herr Suvelack's long promised flight to London, and he started off from Essen. After flying for about an hour he found his compass had gone wrong, and therefore decided to descend. On coming down through the clouds he discovered he was over water, and rising again he steered southwards, and eventually landed near Deventer on the Zuyder Zee. On making enquiries he learnt that fog was very prevalent all along his proposed course, and on that account decided to postpone his attempt until May.

## Attendances at Olympia.

DURING the eight days that the Olympia Show was open, the attendances were as follows:—

Friday ... ..	877	Wednesday ...	5,880
Saturday ... ..	6,206	Thursday ... ..	4,232
Monday ... ..	3,525	Friday ... ..	5,794
Tuesday ... ..	4,023	Saturday ... ..	9,387

This represents a total of 39,924, an increase of some 5,250 on the last Show in 1911, when there was a motor boat section.

## Eastchurch to Hendon.

MR. FRANK McCLEAN and Lieut. Gregory, R.N., carried out a practical experiment on Monday with a view to ascertaining whether a pilot could reasonably find his way without map or compass. Starting from Eastchurch on a Short biplane they crossed the Thames at a height of 1,500 ft., and passed over Stanford-le-Hope. They had hoped to follow the River Lea, but were unable to see it owing to fog, and in consequence they had to descend twice to enquire the way. Eventually they landed safely at the Hendon Aerodrome, after a journey which had occupied an hour and a quarter.

## Aircraft for War.

LECTURING before the Royal United Service Institution on the 19th ult., on the subject of aeronautical progress, Col. J. D. Fullerton, R.E., expressed a doubt as to whether it was worth while building dirigibles. They would be found useful for meteorological work, and possibly, until larger aeroplanes were built, for war purposes also, but the large targets they formed and the risk of explosion were such serious disadvantages that it was not desirable to manufacture them on any considerable scale. Any dirigibles built should be of the rigid type with lifting screws and a shock absorbing device.

He also advocated that the Royal Flying Corps should have its own Commander-in-Chief, and have a separate organisation from the land and sea forces.

In the discussion, Mr. J. Weiss expressed the opinion that much larger machines would be built during the next five to ten years, and that they would be capable of carrying fifty to a hundred men.

## At Hendon.

ON Tuesday last week, Richet was making an exhibition flight in a very high wind, flying the Breguet, and had difficulty in confining his flight to the neighbourhood of the aerodrome. On Wednesday, Verrier was out with a Maurice Farman, although the wind was very great and as bad as the previous day.

## Mr. Hamel at Brooklands.

ARRANGEMENTS have been made by the Brooklands Automobile Racing Club for Mr. Gustav Hamel to fly at the track every Sunday afternoon up to the end of April. The flying will commence at 3 p.m. each day. In addition, the Brooklands Aero Club are arranging races and competitions for every Saturday and Sunday afternoon throughout the season.

## English Pilot at Clement-Bayard School.

SOME fine flying is now being done by Gastinger and Guillaux on their Clement-Bayard monoplanes at Issy, and a good many passengers have been gratified with trips. On the 20th ult. the well-known English pilot, Mr. J. L. Hall, made a splendid trial on one of the monoplanes.

## Another Grade of Shell Spirit.

IT is announced by the British Petroleum Co., Ltd., that in order to increase the supply to meet the enormous demand, the proprietors of Shell motor spirit have introduced a new grade of petrol, which will be known as "Shell II." This is packed in cans, the top half of which will be painted the familiar red colour and the lower half French-grey.

Prices (England and Wales): Shell motor spirit, in red cans, 1s. 9d. per gallon; "Shell II," in red and grey cans, 1s. 7d. per gallon; "Crown" motor spirit, in cans painted French-grey and embossed "Crown" motor spirit, 1s. 6d. per gallon.

All the prices noted are for England and Wales and are retail prices, including Government duty of 3d. per gallon.

# FOREIGN AVIATION NEWS.

## Another Gordon-Bennett Cup.

FOLLOWING a conversation which he had with M. Jacques Schneider, Mr. James Gordon-Bennett has offered to the Aero Club of France a cup of a value of 50,000 francs for a race for hydro-aeroplanes. The race, over a distance of about 200 kiloms., will be held in Beaulieu Bay, between Cap. Martin and Cap. Saint-Hospice.

## A Record Meeting at Juvisy.

THE flying meeting arranged at Juvisy for last Sunday afternoon, in memory of André Frey, proved a great success, and the big crowd which visited the aerodrome during the day saw some of the most noted of French flyers in the air at one time or another. Among the twenty-one pilots, the majority of whom arrived by

way of the air, taking part were the Vedrines brothers and Prevost on Deperdussins, Chevillard on Farman, Bielovucic on Hanriot, Guillaux and Gastinger on Clement-Bayards, Brindejone des Moulinais and Legagneux on Moranes, Baron Pasquier and Daucourt on Blériots, Gobe on Nieuport, Amerigo and Molla on R.E.P., &c.

## More Farman for French Army.

THREE M. Farman machines being ready at Buc for delivery to the French Army, it was decided to deliver them at Etampes by the air way. Piloted by Fourny, Senouque and M. Farman, each with a passenger, the three machines flew over in company on the 20th ult. On Saturday, three more M. Farman machines were handed over to the French Army at Buc, the tests being carried out by Bernard and Fourny.



## Two More Breguet Superior Pilots.

BOTH Sergt. Petit and Sergt. Vuarin have now completed their tests for military *brevets*, on an 80-h.p. Salmson-Breguet, at the Etampes military aerodrome.

## A Farman Superior Pilot.

STARTING rather late on Saturday afternoon Lieut. Mercier finished his first flight for a superior *brevet* after dark, but he made a safe landing at Chalons by the aid of the fires which had been arranged by his comrades. His course of 200 kiloms. was from Mourmelon to Sissonne and Mailly Camps and back to Mourmelon.

## Another Deperdussin Superior Pilot.

ON Saturday last, Capt. Delagarde made his first qualifying test for his special military *brevet*, going from Betheny to Mailly Camp and back on his Deperdussin. Lieut. Devienne flew to just by Vouziers.

## Garros at Nice.

GARROS is still busy at Nice testing his new Morane-Saulnier monoplane in view of his projected attack on the passenger height record. On Saturday he flew from Nice to Monte Carlo and back. An interested spectator of the flight was Leon Morane.

## Farman Hydro-Avions at Boulogne.

DURING last week some splendid flying was done by Henry Farman and Fischer on the H. Farman hydro-avions at Boulogne, and there is no doubt that as a result of the tests which are now being carried out these machines will give a good account of themselves at the forthcoming Monaco meeting.

## A German Record.

LIEUT. WEJER of the Metz aviation centre, on the 21st ult., made a German military record by taking a passenger up to a height of 2,787 metres.

## German and Military Aircraft.

IN its next Budget it is reported that the German Government will include a sum of £1,800,000 for aeronautics, £1,000,000 for the army and £800,000 for the Navy. One hundred machines will be ordered before April 1st next, and it is expected that by the end of the year each army corps will have a dozen aeroplanes, half of which will be held in reserve.

## Night Flying in Germany.

THE first attempt at military night flying at the Metz ground in Germany on Monday evening was not an unqualified success. One of the machines was completely wrecked in landing, and both pilot and passenger were injured.

## Non-Com. Pilots in Germany.

IT is understood that the half-dozen non-commissioned officers of the German Army who were trained as aeroplane pilots last year have turned out so well that thirty more have been detailed for instruction.

## The Italian National Fund.

IT has been decided to close the Italian National Fund for military aeronautics, to which the subscriptions have totalled over £132,000.

## Hydro-Aeroplane Races on Lake Constance.

ARRANGEMENTS are in hand for holding a series of competitions for hydro-aeroplanes on Lake Constance from the 8th to 13th of July. The events will include a speed race of 200 kiloms., and two circuits of the lake. The prize list will total to something like £5,000.

## Aircraft Instead of Warship.

IT is stated that the £28,000 subscribed in Sweden for the purchase of an ironclad is to be utilized for the purpose of establishing an aerial fleet for Sweden.

## Death of an Austrian Pioneer.

FROM Vienna, on the 24th ult., was announced the death of Herr Wilhelm Kress, the well-known Austrian engineer, who was one of the earliest workers in the science of aviation in that country.

## The Aviators of Europe.

A MEMBER of the Moscow Aero Club, after a tour of Europe, has presented a report to his Club as to the number of pilots in each country. According to his figures France heads the list with 1,200 aviators, of which 400 are military, Germany being second with 700, of which 200 are military, and Great Britain third with 450, of which 200 are written down as military. Russia is credited with fourth place with 250 pilots, including 120 officers, while Italy is fifth with 200 aviators, of which one half are military.

## Bomb Dropping Contest in Russia.

THE Russian War Department is organising a competition for devices for dropping bombs. The competitors will have to drop five bombs on to stationary and moving targets from a height of at least 500 metres from aeroplanes and between 700 and 1,000 metres from dirigibles.

## The Russian National Fund.

UP to January 1st, the amount received by the Imperial Aero Club towards the National Aviation Fund was £10,660, of which over one-third has already been employed for the purchase of aeroplanes and motors. The municipal authorities of Lodz have given £2,600 to provide two aeroplanes for the Russian Army.

## One-Design Flying Boats.

A NUMBER of members of the American Aeronautical Society are seriously considering the question of organising a one-design class of hydro-biplanes and holding races for the class on the shores of Staten Island every Saturday afternoon during the summer.

## A New Single Propeller Wright Biplane.

FOR the coming season the Wright Co., of Dayton, O., announce that they are building a new model, to be known as Model E., specially designed for exhibition flying. It will have a single propeller, driven either by a 4- or 6-cylinder motor. All the old models will be continued, and any of them may be equipped with hydroplanes.

## Increased Pay for U.S. Military Fliers.

BOTH Houses of the U.S. Parliament have now approved of an increase of twenty per cent. in the pay of officers of the Army, Navy, and Marine Corps who may be detailed for duty with the military and naval branches of the Aviation Corps.



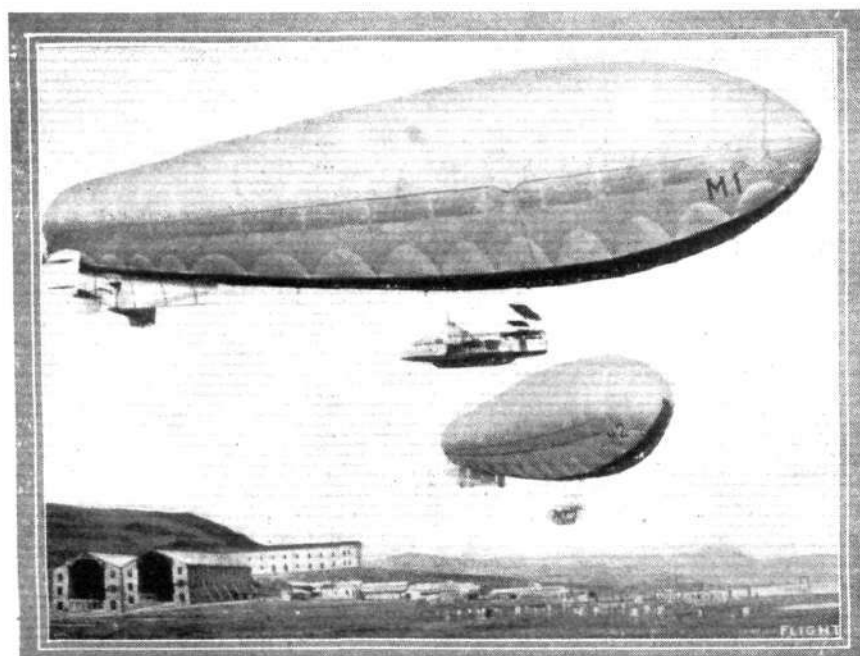
## AIRSHIP NEWS.

### Another Long Zeppelin Cruise.

LEAVING Cologne at a quarter to nine on Saturday evening, the new military Zeppelin Z1 made an all-night cruise over Western Germany. At midnight she was over Heilbronn, in Bavaria, at 2.45 a.m. at Wurzburg, at 5 a.m. over Frankfurt-on-Main, and at 7.45 over Karlsruhe, while the landing was effected at the military station at Oos, near Baden-Baden, at 8.15 a.m. During the cruise of 12½ hours a distance of about 500 miles was covered, and practically all the time the airship was in wireless communication with Karlsruhe.

### More Airships for France.

AT a banquet given in his honour on Sunday, Gen. Hirschauer, the Inspector-General of Aeronautics, stated that the French Government had just signed contracts for the construction of seven dirigibles, each of 20,000 cubic metres capacity, and a speed of not less than 75 k.p.h. Bonuses will be given to the constructors if the airships exceed the contract speed or ascend 2,000 metres in less than the time specified.



THE ITALIAN DIRIGIBLE FLEET.—M1 and M2 in the air at Vigna di Valle.



## STABILITY DEVICES.

By MERVYN O'GORMAN.

(Continued from page 238.)

37. The pendulum shaft does not now remain vertical. The thrust of the propeller is now less than before, the bob is pushed backwards by the head resistance plane till the pendulum shaft is at right angles to the trajectory. Thus eliminating the objection above.

Such a pendulum device is only very partially "stabilising," it has nothing to do with lateral balance, but it has a tendency to correct variations in the angle of attack of the wind since we still get the corrective action for an up-gust or a down-gust.

Whether or not this or any device is "worth while" is another and a very subtle question not to be answered by the simple negative suggested by weariness of the subject.

38. **Category C. Bob-weight Devices.**—Perhaps the next most popular of the pendulum devices is the one which causes a

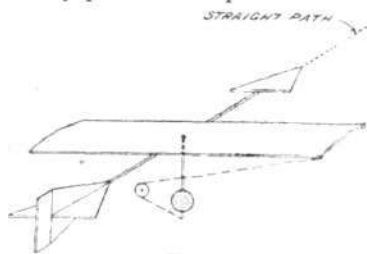


Fig. 9.

centrally suspended weight to pull down directly, or through a relay, the wing flap on the side towards which the weight has moved (see Fig. 9, in which only one wing control is shown for simplicity).

This gives rise to an air reaction, tending to restore the wing which is too low to its old level, and this so far is a good intention;

indeed, it is good in effect if quick enough. Moreover it will be seen that in this case, were the aeroplane to be yawed without banking towards the left hand, the weight would fly out towards the right (Fig. 10), and so cause the right flap to be pulled down until

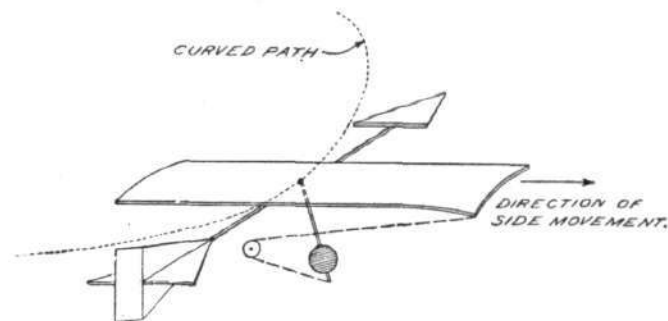


Fig. 10.

the banking was sufficient to allow the bob-weight's line to hang more or less perpendicularly to the wing spar (Fig. 9). At this an approximation to the proper condition for a banked turn would have been achieved.

39. A criticism of this method is that it is either sluggish or calls for another device, "the fin," to do its works. Any finless aeroplane when ruddered without banking, necessarily yaws and side-slips outwards (Fig. 11), and the more the side-slipping move-

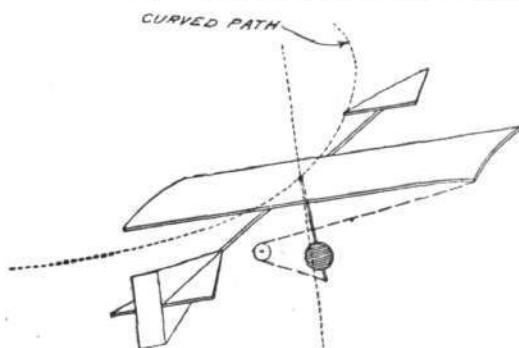


Fig. 11.

ment, the less the pendulum swings out, so that the more the aeroplane side-slips, the less the device acts. In the case where the aeroplane side-slips without proper relation to the turn, e.g., if it were not following a curved path, but commencing to side-slip in any sideways direction, with an increasing side velocity, the bob-weight would act as an accelerometer, i.e., it would lag back, due to its inertia and therefore would not introduce any useful pull on the warp wire which banks the aeroplane in the manner for safety.

40. This last is the beginning of the typical dangerous side-slip and failure of the device here is failure indeed. Moreover, since no change of course on to a circular path is usually effected unless the aeroplane offered some fin, or fin equivalent, it appears necessary to show that some special merit over the prompter fin method or banking by hand is obtained by pendulum control for lateral balance. No such proof is available at present but it does not follow that no conceivable pendulum method will be of use here also.

41. **Pendulum and Relay.**—Gawlet's device (10184, April, 1910) is an example of an elaboration in which the pendulum is *in vacuo* and operates electric switches which, in turn, actuate the elevator and warp through a compressed air device. No mention is made of how to overcome the difficulty that the same correction is given to the elevator in the two cases:—

- (1) when the aeroplane engine stops pulling and gives loss of air speed and
- (2) when a gust strikes the aeroplane and slows it as a whole, but giving increased air speed;

while these two occurrences require opposite elevator correction for speed maintenance.

Laterally similar conundrums are introduced since similar pendulum action results from side movement due respectively to a side gust and due to a side-slip although lateral control movements desirable in the two events are opposite to one another.

42. Such devices as these if they were worked out would not be devoid of interest in spite of their inutility. There is a vast gulf fixed between the theory of a mechanism which tells the control what to do, and the production of that mechanism within the weight limits needed for aero purposes. The evolution of an electric, a pneumatic, or a mechanical relay device for aeroplanes are exceedingly difficult problems, and may well be utilised in the near future. It is unfortunately usual for the inventor to set out a theory and stop there—after the easy part is done. The theory of a watch is quite simple, it has taken centuries to evolve the reliable thing we use, hence real workers in this field are as welcome as they are rare.

43. Wendland (8326, April 4th, 1910) balances laterally by causing a pendulum to deflect a blast of air under one wing or under the other.

44. **Pendulum without Relay.**—Schmitt's scheme is a curious example of the opposite kind when the sensitive relay and its troubles are evaded by introducing others incidental to the hingeing of all the fundamental parts, so that they shall constitute a heavy pendulum (Fig. 12). His patent (11355, May, 1909) claims that it entitles him to dispense with the tail. He hangs the weights of pilot, engine, &c., in a frame below a hinge which is parallel to the main wing spar and arranges that when the wings are given a greater angle of incidence by the flyer the movement of the centre of pressure (which he mistakenly assumes to be backwards under these circumstances) is attended by such a movement backwards of the chief weights that these remain always underneath the centre of pressure, and thereby the upsetting couple which the tail corrects for is not introduced. He forgets that the wind moves and varies the centre of lift independently of his intentions and very quickly, and he is misinformed as to the direction of movement of the c.p. of cambered aerofoils.

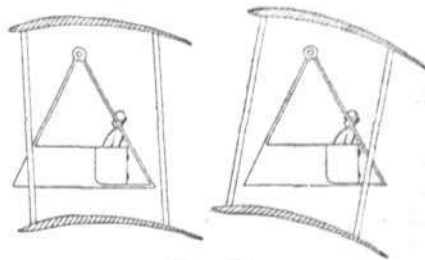


Fig. 12.

This type of device has benefited the patent offices of France, England and U.S.A. in various forms, and it seems a pity the money should not have been spent on aviation.

45. Planes, Ltd., and Thompson (April 19th, 1910) suspend the car flexibly from the wings and the adjustments of the planes for steering and balancing are effected by movement of the car. This car movement is also controlled by a lever.

46. Mitchell (4249, February 20th, 1911) causes his suspended car to bend down two balancing flaps which extend beyond the wing tips. The flaps are cross-connected.

47. Adam and Stamkort (4408, February 21st, 1911) balance an aeroplane by running electrically a carriage of considerable weight, and bearing two accumulators and motors, the pendulum consists of a mercury switch in which the liquid flows over the appropriate contacts.

(To be continued.)

# AERONAUTICAL ENGINES.

(Continued from page 199.)

**Reliability and Weight.**—Reliability may be regarded from two aspects, firstly, the absence of structural weakness of any kind, and, secondly, an immunity from defective lubrication, cooling, carburation and ignition.

The first entails a consideration of the question of weight, and in this connection it should be remembered that in any engine lightness must be achieved by construction, not by increasing the stress or by reducing bearing areas. Now there are many ways in which reduction in weight per horse-power may be made without the sacrifice of either strength or rigidity, the principal of which are as follows:—

- (a) By the employment of materials of low specific gravity or great strength.
- (b) By limiting the volume of the material.
- (c) By reducing the number of parts subject to stress.
- (d) By the more economical use of the material.
- (e) By so disposing the material that it is better able to resist the loads which it is called upon to withstand.
- (f) By the use of the simplest construction possible.
- (g) By the adoption of air-cooling for the cylinders.
- (h) By running the engine at higher speeds and gearing the propeller down.

As regards (a), much has already been done in this direction, not only in aeronautical engines but in other classes of work; aluminium alloys are used for the crank-case, alloy steels for crank and cam-shafts and connecting rods, and pressed steel for pistons, &c., until the further reduction of the dimensions of these parts would render them liable to excessive distortion. It has been suggested that pressed steel might, with advantage, be used for the construction of the crank-case, but since many portions would require to be made extremely thin, and owing to the limited extent to which webbing or ribbing can be utilised, the "whip" in such a design, with the consequent distortion of bearings, must always prohibit its employment in this class of engines. The author does not, therefore, anticipate that much further progress will be made by these means unless some other metal is produced possessing similar physical properties to those of steel, but having a lower specific gravity. Some substitute will, however, have to be found for aluminium in the crank-case and other parts of engines for hydroplanes on account of the deleterious action of seawater on this material.

When proceeding as indicated in (b), the pistons may be reduced in weight by shortening the length of skirt; valves, by limiting the length of the stem; water-jackets, by the use of sheet metal; the water carried, by having narrow water spaces; the bottom halves of crank-cases, by employing sheet metal; entire crank-cases, by allowing the minimum amount of clearance for the working parts; couplings, by removing metal where unnecessary; and fly-wheels, by the use of larger diameters, always provided that no detrimental effects are introduced thereby.

If, however, the pistons are made very short, they have a tendency to tilt, and limitations are thereby imposed. Valve stems must be long enough to allow of sufficient lift to give enough area for the ingress or exit of the gases and to afford an adequate length for the spring and guide. Water-jackets of copper or other metal are permissible, providing that the methods of jointing to the cylinder at the ends, at the sparking plugs, and at the gas apertures are satisfactory, and that the jacket is free to expand independently of the cylinder. This is not always the case; for example, where steel rings are shrunk on, or the ends of the jackets are spun into a recess in the cylinder, or the ends are held by screws or rivets, there is a great possibility of leakage taking place after a time due to the deformation of the metal, and this is not entirely eliminated by the insertion of bellows in the jacket. Water spaces must not be made unduly narrow or overheating will occur, while, if the disc of the fly-wheel is very thin, possibly drilled out to assist in giving lightness, its lateral stability will be impaired. The other methods mentioned will depend for their efficacy upon the details of the particular constructions adopted.

(c) One method in which this is effected is by the use of a single cam to operate two inlet valves, as in some Vee engines, or an inlet and an exhaust valve as in other engines, principally of the Vee and radial type, but yet in many designs long push or pull rods actuate the valves through rocking levers. This, in the author's opinion, is altogether inferior to an arrangement in which the valve is directly operated, as is found in the Chenu or Green Panhard motors, for, apart from the greater weight entailed, the force required to actuate the gear is very great and necessitates the use of larger cam-shafts and stronger springs. The adoption of such an arrangement is largely attributable to the difficulty of devising a satisfactory overhead valve gear, on the one hand, and because the employment of the more conventional design used on automobile engines adds somewhat to the weight of the cylinders.

The direction in which many engineers are working is referred to in (d), since it affords an easy way of acquiring a light construction, but it has caused the evolution of some freak designs, the principal claim of which to notice seems to rest upon their ingenuity rather than upon any useful quality. By far the greater number of engines that are now manufactured are of the Vee, the radial, the semi-radial and the rotary type, as the length and weight of the crank-case and shafts may thus be reduced considerably, but unfortunately other factors are thereby introduced which cause them to be less satisfactory than the vertical engine. Mention has already been made of one disadvantage under which they labour, namely, the types of valve gear which then become necessary and which are especially inferior in rotary engines, while other detrimental features will be referred to later.

The two-stroke engine may also be regarded under this heading, since by virtue of doubling the number of impulses per revolution, a great reduction in the actual weight per horse-power should be possible. The fact remains, however, that few engines of this type are in actual use, and that in these there is little advantage in respect of weight, largely owing to the construction necessary to ensure the attainment of as low a fuel consumption as with engines operated on the four-stroke cycle.

The use of hollow shafts and rods, H-section connecting rods, &c., and the care taken to subject parts to tensile rather than compressive stress, are illustrative of the methods referred to under (e), and these may be widely adopted with advantage wherever practicable. Great care must, however, be exercised in determining the proportion of the parts so constructed, in order to ensure that there shall be no risk of collapse. For example, cases might be cited in which the thickness of the metal at the journals of the crank-shaft is such as to render it extremely probable that the sides will diverge laterally under load, causing excessive pressures on the bearings, and ultimately, the fracture of the part. All abnormal construction is to be deprecated, and the proportions used should not differ greatly from those accepted in standard automobile practice.

The benefits to be derived from making the design as simple as possible need little comment, as the elimination of all superfluous fittings and the avoidance of an intricate construction must effect a saving of weight and, in addition, contribute to a lower cost of production. It is necessary, however, to remember that all devices or parts necessary for the efficient working of the engine must not be sacrificed, for "the art of successful design lies in knowing exactly what parts can be left out, and how simply and cheaply we can make and fit those parts which are essential, without impairing their value as regards the functions which they perform."

Heading (g) raises the oft-discussed question of the relative merits and demerits of air-cooling. Undoubtedly, the weight can be much reduced by this method, and the absence of water joints and connections tends towards simplicity, but it is well known that, in general, a lower brake mean effective pressure is obtained with this type of engine than with that using water-cooling, largely because of the greater frictional losses between the piston and the cylinder and the reduced charge of gas taken. The former is due to the distortion of the cylinder owing to the unequal expansion which results from lack of uniformity of cooling, as well as the higher temperatures at which these engines are run, while the reduction in the charge taken is attributable to the high temperatures within the cylinder. Further, the additional details which become necessary to ensure sufficient air passing over the cylinders should receive attention. If a separate fan is employed, and the cylinders are closed in by a sheet metal casing, the design requires very careful development to ensure that the ultimate results achieved are even equal to those obtainable with water-cooled engines—in fact, in most cases the weight per horse-power is greater for the same speed of revolution of the crank-shaft. With engines of the radial or semi-radial type, and especially with rotary engines, the air resistance is enormous and increases with the power developed, since the bore of the largest cylinder to which air-cooling can be effectively applied is limited, and, therefore, increase in power can only be obtained by increasing the number of cylinders.

\* See Proc. I.A.E., Vol. IV., p. 269, "Design of Petrol Motor Vans."

(To be concluded.)



## An Airship on a Coat-of-Arms.

IN memory of the German aeronaut Erbsloeh, the Leichlingen Municipal Council has decided to include a picture of his dirigible in its coat-of-arms. It was in the city that Erbsloeh built the airship on which he met his death some time ago.



# Models

Edited by V. E. JOHNSON, M.A.

## The Aero Show—Club Exhibits.

LEYTONSTONE AND DISTRICT.

THE exhibits of this club included seven rise-off-the-ground models, and one hydro-aeroplane. We understand that the club was only started last October. The models shown undoubtedly reflected considerable credit on so young a club. G. A. Hawthorne exhibited a tractor monoplane, twin-gear, single propeller, covered-in fuselage, double-surfaced wings and tail, weight 17 ozs., loading 8 ozs. per

with advantage have been larger. T. Jack, a tractor monoplane, with a pivoted main-plane, single propeller, twin-gear; the front skid appeared too weak, and the propeller would in all probability be broken in the case of a bad landing. F. E. Grattan, a monoplane tractor, single propeller, twin-gear, double-surfaced wings and fitted with good large wheels; the chassis, however, struck us as being unnecessarily heavy. A. R. Towers, a tractor hydro-aeroplane with twin propellers, built-up fuselage, two front and one tail float.



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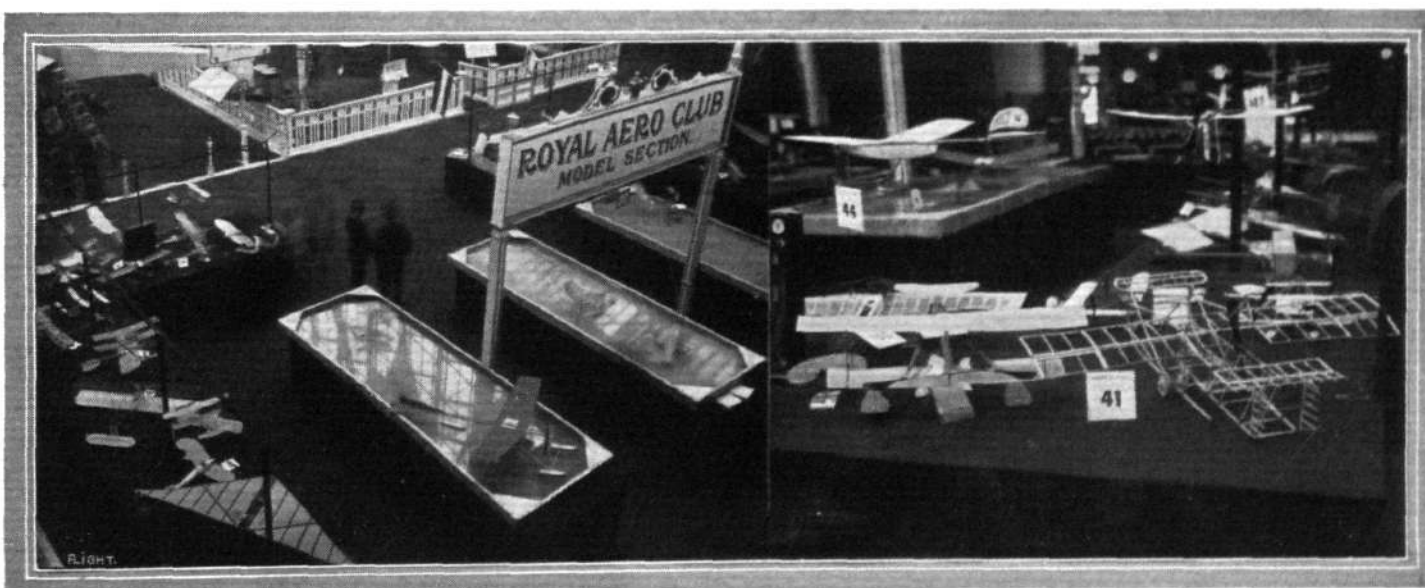
## THE KITE AND MODEL AEROPLANE ASSOCIATION.—Some of their exhibits at Olympia.

sq. ft. H. Bedford, a monoplane tractor, single four-bladed propeller, twin-gear, covered-in fuselage, laminated spring chassis—the chassis is not, however, sprung where it is generally most wanted—single-surfaced wings, loading 8 ozs. per sq. ft. H. F. Green, a tractor monoplane, twin-gear, one propeller, open fuselage. F. A. Hawthorne, a tail type biplane (the

It will be interesting to see if a model of this kind can actually accomplish anything on the water. So far, no tractor hydro-aeroplane has done so—i.e., not in any open competition.

REIGATE, REDHILL AND DISTRICT.

Accompanying each model was a little model easel containing a



The model hydro-aeroplane tanks and part of the model exhibits at Olympia.

"Flight" Copyright.

only biplane exhibited by the club), twin-propellers, movable planes, fitted with upturned wing-tips for stability, loading 5½ ozs. per sq. ft. S. H. Chapman, a tractor monoplane, single propeller, twin-gear, covered-in fuselage, sprung chassis; the wheels might

card which contained a brief typewritten description of the model, a little feature which could well be copied. This club is well-known for the flying of strongly built heavy models, following the lead, no doubt, of Mr. J. W. Burghope, who will be best known to



our readers as the designer of a Nieuport model, illustrated and described some time ago in FLIGHT. We cannot say that the principle is one which we can recommend, and it certainly found no favour with the judges. Maximum strength combined with minimum weight is the great aim in all matters aeronautical. What advantage to build a heavy non-sprung chassis, when a lighter sprung one answers the same purpose, not only as well but better? The simplest and probably the best model tractor chassis at the Exhibition was that of Mr. J. H. Dollittle, which was sprung both longitudinally (by the flexible nature of the skid) and laterally; moreover, the amount of the springing was well-proportioned to the weight, etc., of the model. Generally speaking, this did not appear to be the case. Another point in connection with this club exhibit was the large size of the covered-in fuselage or body of the models exhibited. Comparing these with the graceful monocoque body of Mr. Desoutter's power-driven model, one's sense of proportion must undoubtedly prefer the latter; we are not referring here to any scale dimensions—merely to the general appearance and sense of the relative proportion and fitness of things, which is not without its weight in a competition exhibition of this kind. After making the above remarks, which the club can think over and discuss at its leisure, we have nothing but praise for the machines, which showed excellent workmanship and some very good points in design. Unfortunately, generally speaking, we believe these models are not competing at Hendon on Saturday; we should certainly like to see some exhibition flights by at any rate Messrs. Burghope's and Norton's r.o.g. models. W. Key exhibited a scale tractor monoplane. Length, 34.5 ins.; span, 36 ins.; weight, 15 ozs.; area of main plane, 201 sq. ins.; diam. of tractor, 10.5; telescopic springs on chassis; cellon dope. Also a hand-launched canard-type monoplane, twin propellers. M. H. Wilson: A tractor monoplane. Length, 2 ft. 9 ins.; span, 3 ft.; weight, 10 ozs.; area of main plane, 180 sq. ins.; diam. of tractor, 11 ins.; cellon dope. J. W. Burghope: Two models, one a scale tractor biplane, single propeller. Length, 42 ins.; span, 40 ins.; weight, 19 ozs.; area of main plane, 350 sq. ins.; tractor diam., 13 ins. The other, a tractor monoplane, of which we have not at present the particulars. W. H. Norton: Two models, one a scale Caudron monoplane. Length, 2 ft. 7 ins.; span, 3 ft. 1.5 ins.; weight, 20 ozs.; area of main plane, 212.5 sq. ins.; diam. of tractor, 12 ins. Differing from its original in the drift attitude of the chassis [this we are afraid has been overdone], spring shock absorbers, back and front drift wires for wing bracing. The front chassis struts are continued to form the pylon to support the wing bracing, the two being thus contained in one member. Cellon dope. Also a hand-launched monoplane, canard type; the fuselage is torpedo type, the motor rod being contained within the fuselage in such a manner that the rubber torque has no twisting action on the fuselage. Here, again, the size of the fuselage struck us as unnecessarily large, or, to speak more correctly, "fat."

## NORTH-EAST LONDON CLUB.

This club exhibited seven models, of which only two were self-rising, the other five being hand-launched models. J. E. Louch exhibited a hand-launched tractor monoplane, one propeller twin-gear, steel skid curved upwards to centre of propeller boss, upturned wing tips for stability; also a tail type monoplane with upturned wing tips. H. T. Carter, a canard type hand-launched monoplane, twin propellers. A. S. R. Lewin, a hand-launched canard type monoplane, twin propellers, with turned up elevator tips. W. Gittus, a tail type self-rising monoplane, twin propellers, steel sprung chassis, vertical fin below tail plane, tail elevation screw, adjusted flexible rear edges to the main plane. B. H. Longstaffe, self-rising tractor, single propeller twin gear, covered-in fuselage, streamline body, hollow struts for main plane, depressing tail, large vertical triangular fin above the tail. The designer stated that by the use of twin gearing he found he could reduce the weight by 4 ozs., owing to the absence of torsional forces. H. G. Bond, a tail type hand-launched monoplane. The work of the club shows considerable promise, but cannot be said to be, as a whole, at present, equal to that of some of the other clubs.

## AERO MODELS ASSOCIATION—NORTHERN BRANCH.

This club exhibited five models, of which three were tractors. All five models were of the rise-off-the-ground type. H. R. Weston exhibited a tractor monoplane, one propeller, twin gear, also what was apparently a weighted skid to ensure balance; the model was fitted with very tiny wheels and a back skid, which appeared too weak. The model was, however, a good flyer, and won the first official K. and M.A.A. distance for hand-launched tractors—viz., 125 yds., less 40 yds. windage, i.e., 85 yds.; weight 6½ ozs. H. E. Fletcher, a twin-propeller canard-type biplane. F. G. Hindsley, a tractor monoplane, single propeller, twin gear, with enclosed body (unfinished), 39 ins. span, 39 ins. in length, 180 sq. ins. of lifting surface; weight, 11.5 ozs., loading, 9½ ozs. per sq. ft. M. B.

Ross, a tractor biplane with staggered planes, a four-bladed propeller, twin gear, enclosed torpedo-shaped body, tail-fin adjustable rudder. R. L. Rogers, a tractor monoplane, twin propellers, vertical rudder behind the tail, built up motor rod. It is certainly a healthy sign of progress when all the models exhibited by a club are of the self-rising type, and the exhibits were decidedly good as a whole; it was unfortunate that the full number of models could not be shown.

## BATH AND SOMERSET MODEL AERO CLUBS.

The exhibits of this club were decidedly lacking in finish, and, from the point of view of workmanship, we are afraid not very much praise could be bestowed. There appears to be, however, considerable ingenuity amongst some of the club members, which should certainly be cultivated for all it is worth and not allowed to run to seed. Their exhibits included a power-driven model and a power plant, which is more than could be said of any of the others—save, of course, the K. and M.A.A. L. S. Smith exhibited a power-driven tractor biplane; the motor was a petrol one, on decidedly ingenious lines, which so far, we understand, has not worked very well. The size and diam. of the propeller were much too small. All the same, we trust the designer will continue his experiments until he has met with some success. It is just such experiments as this that are so much wanted. G. M. Hick, a tail-type monoplane, twin-propellers, bird-shape wings; also a spirit-motor on somewhat the same lines as was once tried by the Hon. C. A. Parsons, of turbine fame, and described in one of the earliest numbers of FLIGHT. The main idea appears to be the doing away with a separate heating apparatus. Methylated spirits is drawn (by working the engine) into the boiler, which is fitted with a vapourising coil; the boiler is warmed up and the engine started, the exhaust from the engine is carried back by means of a pipe to the warming up lamp flame, where it is ignited, and thereby itself tends to still further heat and vapourise the spirit in the boiler, the apparatus is evidently now self-working, and only a small flame is necessary to ignite the exhaust; under such circumstances the pressure in the boiler can obviously go on increasing, and the power as well. The plant is stated to give a 4-oz. thrust. The weight of the plant is not given. Silver soldering is employed. From an exhibition point of view the idea is quite spoilt from the design and workmanship exhibited in the apparatus. The weight of the plant could undoubtedly be cut down by nearly if not quite one half, especially where the engine is concerned. A descriptive printed or type-written card could also with advantage have accompanied the exhibit. G. E. Page, an unfinished monoplane tractor, self-rising, no propeller, very large tail, rough construction. R. E. Bush, a monoplane tractor, fitted with dummy engine, and a propeller having no pitch. R. C. Cross, a tail-type monoplane, twin-propellers, small fin in front, very roughly-constructed wheels. Two of the machines exhibited afforded a striking contrast in the matter of "tails."



## KITE AND MODEL AEROPLANE ASSOCIATION

### Official Notices.

#### British Model Records.

Hand-launched	Distance	A. E. Woollard	477 yards.
	Duration	A. F. Houlberg	89 secs.
Off ground	Distance	G. Rowlands	232 yards.
	Duration	A. F. Houlberg	51 secs.
Hydro, off water	Duration	G. P. Bragg-Smith	25 secs.
Single-tractor screw	Distance	F. G. Hindsley	173 yards.
hand-launched	Duration	F. G. Hindsley	36 secs.
Do., off ground	Duration	H. R. Weston	21 secs.

Membership.—All members who have induced their friends to join the Association during the Aero Exhibition are asked to send in the forms to the Hon. Secretary at once so that they can be elected members.

Competitions for Year.—The Council will be pleased to receive any suggestions from members as regards the competitions, so that they can consider them when drawing up the season's programme.

Lecture.—Mr. A. P. Thurston will lecture before the Aeronautical Society of Great Britain at the United Service Institution on Wednesday, March 12th, at 8.30 p.m. His subject will be "Aeronautical Research Work in the Home." He will describe fully the method of construction and use of apparatus which can be erected cheaply and used in the home, also a series of researches made with such an apparatus will be published. There is a large field of most useful work open to anyone willing to work, and it is hoped that many of the members of the Association will be induced to take an interest in this much neglected but very fruitful field. Tickets can be had on application to the Hon. Secretary.

Affiliation.—Application for affiliation has been received from the Paddington and District Aero Club, and same has been granted.

Aero Exhibition Competitions.—The flying trials take place to-day, Saturday, March 1st, at the London Aerodrome, Hendon, at 9 a.m. sharp, and the hydro competition at Welsh Harp, Hendon.

27, Victory Road, Wimbledon, S.W.

W. H. AKEHURST, Hon. Sec.



## MODEL CLUB DIARY AND REPORTS.

CLUB reports of chief work done will be published monthly for the future. Secretaries' reports, to be included, must reach the Editor on the last Monday in each month.

E. Grinstead and District (ROSENEATH, WEST HILL, E. GRINSTEAD). FLYING on Mount Noddy and the Forest every Wednesday and Saturday, 2.30. Competition fixture list to be announced at early date.

**Monthly Report.**—This club, which has been recently formed, is now in full working order. A workshop has been built, and already members are starting on models of exceptionally novel designs. Several members of the club visited Olympia on Feb. 19th, and it is hoped that the various methods of construction, &c., employed by exhibitors there will be turned to good account by the members. Regarding club work, H. Smither has had successful flights with tractor mono., r.o.g. F. Armstrong doing good distances with loaded-elevator type. Members find, with r.o.g. tractors, the lighter they are made, up to a certain point, the better they stand a heavy landing.

#### Ecclesall and District (50, CRESCENT ROAD, SHEFFIELD).

AN "Aerial Derby" will be held on Saturday, March 22nd, at Bent's Green, Ecclesall, over a course of about two miles. Three medals offered as prizes. Will all members please attend with models.

#### Hendon and Districts Model Ae.C. (3, ARGYLE RD., W. HENDON)

FLYING week-ends at Cricklewood and Hendon. Competitions, &c., shortly. **Monthly Notice.**—Matters are now progressing very favourably in this club. The committee for the coming season has been elected, and there is every prospect of a good summer's work. Mr. Short has resigned the secretaryship, but has accepted the post of treasurer, jointly with Mr. E. A. Lawrence. Mr. Doidge, the former secretary, being again free to devote his time to the interests of the club, has again been elected to fill the vacant post. Please note changed address. The club has commenced flying on a new ground at Cricklewood, and some excellent flying was done there last week-end by members. Mr. Lawrence's Houlberg-type monoplane easily beat the club distance record, measurement next notice. Mr. G. Hedges is now constructing a seven-cylinder rotary steam engine. Messrs. Hills, Mitchell, Brown, Hayward, Short, Warwick and Doidge have been indulging in week-end flying during the month.

#### Leytonstone and District Aero Club (64, LEYSPRING ROAD).

ON March 2nd, flying at 9.30 a.m., near Bushwood Avenues. **Monthly Report.**—As a result of the Aero Show and the work it entailed beforehand, very little flying was done last month. An account of the club's exhibit at Olympia will appear elsewhere from the pen of Mr. V. E. Johnson, making it unnecessary for a repetition to appear here. All members will be glad to hear that Mr. Handley Page has consented to become president of the club. It seems a happy augury for the future. It is hoped that all members will make an effort to attend the competitions arranged to take place to-day, March 1st, at the London Aerodrome, Hendon, and the Welsh Harp.

#### Manchester Model Ae.C. (14, WARWICK RD. N., OLD TRAFFORD).

**Monthly Notice.**—The club hopes to make the present season the most successful since its formation. Flying meetings will be held each week at Trafford Park Aerodrome and a special feature will be the holding of aggregate competitions. Next meeting, March 8th, at 3 p.m. Tractors, r.o.g. and hydro-aeroplanes will receive special attention and certificates for such will be awarded as in the hand-launched models tests. The secretary will be glad to receive as many subscriptions (5s.) as possible at next meeting so as to meet the expenses of the club, such as prizes, &c. A meeting was held in Heaton Park on Feb. 22nd when Mr. A. V. Roe was present and selected a suitable spot where Messrs. Hurlston and Watson gave an exhibition of flying.

#### Reigate, Redhill and District (8, BRIGHTON ROAD, REDHILL).

**Monthly Report.**—Owing to the exhibits for Olympia, very little flying has been done during the month. Hoyle, Oram, Hooton, Sutton, and several others have done well in bad weather. Mr. Burghope several times out with old Nieuport, which is now "deceased." A loading test was carried out on the wings, the breaking load being 73 lbs. She weighed 38 ozs. in flying order. An extraordinary number of models are ready for the coming season. The conditions for the next competition for the "Rawson Cup" are as follows:—Biplanes to weigh 8 ozs. (minimum), r.o.g. machines, to fly for distance and duration in the same flight. Many visits were made to Olympia by the members. Several interesting machines are building, including Farman-type biplane. Several hydros getting ready. Messrs. Norton, M. Wilson, Burghope, Sutton, and Key exhibited at the Show. Members who have no time to go home for meals now take them in the lounge fitted up with stove, &c.

#### Scottish Ae.S. ("ROCHELLE," LIMESIDE AVENUE, RUTHERGLEN).

Scottish Model Records.				
Hand-launched ...	...	Distance ...	J. S. Gordon	2,006 ft.
		Duration ...	Jas. Myles	65 secs.
Off-ground ...	...	Distance ...	Wm. C. Boyd	739 ft.
		Duration ...	Wm. C. Boyd	33½ secs.
Hydro-aeroplane, off water ...		Duration ...	C. F. Arthur	21½ "
Tractor (single) off ground ...		Duration ...	J. S. Gordon	10½ "
" " hand-launched		Duration ...	J. S. Gordon	16½ "

March 1st, duration competition at Paisley, for pair of propellers, presented by Mr. Myles; 8th, hydro-aeroplane competition at Maxwell Park; 15th, monthly competition at Paisley; 22nd, duration and efficiency competition at Paisley; 29th, hydro-aeroplane demonstration at Maxwell Park.

**Monthly Report.**—The r.o.g. competition, intimated for Feb. 1st, had to be declared off owing to weather conditions, but on Feb. 8th Mr. C. F. Arthur had some very interesting trials with hydro, at Maxwell Park, his times being very consistent, 15 secs., considering the boisterous conditions prevailing. On Feb. 15th, the usual monthly competition was held at Paisley Racecourse, the results being: Wm. Craig Boyd, 49 secs.; W. G. Langlands, 40 secs., 625 ft.; Ian S. Ross, 34 secs.; J. S. Gordon, 33½ secs.; J. C. Balen, 25½ secs., 493 ft. On Feb. 22nd, a demonstration of hydros was given at Maxwell Park, under very trying conditions, the pond being covered with a very thin skin of ice, Mr. Gordon gave a very good display. During the month work has been proceeding quietly, Mr. Boyd having constructed a r.o.g. and a hollow span flyer, of which details will be forthcoming soon. Mr. Gordon is finishing the construction of a tractor r.o.g. which promises well. Now that the better weather is coming the committee appeal to readers interested to call and see the workshop at 18, Holland Street, which is open on Tuesdays, Thursdays, and Saturdays, and also the fact that an aerodrome is to be opened shortly in Glasgow, may, we hope, induce more enthusiasts to join the club.

#### Sheffield Model Aero Club (35, PENRHYN ROAD, SHEFFIELD).

MAR. 3RD, 7 p.m., the club room at back of 32, Carver Street will be formally opened by Mr. E. W. Colver. Flying every Saturday, weather permitting, at the Standhouse Aerodrome, 3 p.m.

**Monthly Report.**—After the close of the weekly contest on Feb. 1st, Mr. R. E. Rayner raised the club and Sheffield record (held by Mr. J. P. Worrall with 53 secs.) to 60 secs. duration. Master C. Dewnap made 48 secs. A general meeting was held Feb. 10th, Mr. E. W. Colver presiding. The rules for the Colver Cup and the President's Challenge Cup were distributed to those present, Mr. Colver having had them printed at his own expense. A well-lighted club-room has been secured at the back of 32, Carver Street, and is being fitted up

with benches, tools, seats, &c. All the well-known aeronautical papers and books will be placed in the library for the use of all members. Mr. Colver has kindly offered the loan of his very fine collection of aviation books to the club library. The prizes were distributed to Mr. R. E. Rayner and Mr. W. H. Bagshaw for the month-ending competition. Mr. H. Slack exhibited at the meeting a carved 30-inch wood propeller, a fine piece of work. Both the cups and the propeller will be on view in course of a week or so in one of the main shop windows of this city. The secretary will be pleased to receive catalogues and pictures on aviation to hang in the club room.

#### S. Eastern Model Ae.C. (1, RAILWAY APPROACH, BROCKLEY).

WEEK-END meetings:—Blackheath and East Dulwich branches.—Mar. 1st, Kidbrooke, 2.30 to 5.30 p.m. Mar. 2nd, Blackheath, 7.30 to 10 a.m.; Lee aerodrome, 10.15 a.m. to 12.15 p.m. Croydon and Beckenham branches.—Mar. 1st, Duppas Hill, 2.30 to 5.30 p.m. Mar. 2nd, Mitcham Common, 2.30 to 5.30 p.m. Croydon and District Aero Club will hold open competitions for duration with tractor models, and for distance with r.o.g. machines.

**Monthly Report.**—During the past few weeks members of the S.E.M.Ae.C. have had a considerable portion of their otherwise available flying time spoilt by rain and fog; but these disappointments only seem to make the members more enthusiastic, and, judging by the extremely useful work now being accomplished, this club should be in a very strong position by the time decent flying weather arrives. The support of the Croydon and District Aero Club, who have now become the Croydon branch of the S.E.M.Ae.C., has considerably strengthened the club's hands, and members will thus be enabled to obtain additional facilities. At Kidbrooke Mr. Geo. Brown has been experimenting with a type of tractor biplane. This model has the rubber encased in a body similar to the enclosed Avro, but the planes are of the Etrich type. This machine, fitted with a 4-bladed screw, is a good flyer, except in strong winds, when the large side-area causes side-slip to such an extent that a nose-dive is unavoidable. Messrs. E. Campbell, R. France, and F. G. Peter have also been flying tractor biplanes at Blackheath. These models are fitted with 4-bladed screws, and Mr. Peter's machine has made some very fine flights. Mr. B. Trask has been testing twin-propeller hydro-biplane fitted with stepped floats, but no successful flights were obtained, owing to the rough weather. Mr. S. E. Grimstone and Mr. W. R. Halnan have been doing good flights with their tractors at Blackheath and Lee, and Mr. G. H. Westwood has again been making short flights with his stream-line tractor mono., but the wings are still too flexible. At Lee, Mr. C. A. Rippon has obtained good results from his large Antoinette-type monoplane (illustrated in FLIGHT recently), also some splendid high flights with a smaller tractor monoplane. Mr. F. Plummer has been getting some splendid distances from his tractor models, which are fitted with built-up fuselages. One of these recently made a flight of 253 yards, which is excellent, considering the amount of detail work embodied in the machine. Mr. L. Brough has been successful with a small hydro-mono, which rises from the water very easily. Mr. F. Dixon has been making short flights with a twin-propeller biplane, the planes of which are staggered and have a high aspect-ratio, and with a little further adjustment useful results should be forthcoming. Mr. L. Hatfull's small automatic-stability tractor monoplane has been in evidence at Lee and Blackheath. Mr. A. F. Chinnery's well-known gull's-wing tractor has been flying well, and succeeded in obtaining second place, with a flight of 136 yards, in an open competition at Mitcham organized by the Croydon branch. At Blackheath, Mr. L. B. Morris has been testing a new tractor monoplane, and at Lee has made some good flights with his single-propeller model. Dr. G. I. MacMunn has been conducting some interesting experiments with new planes on his large twin-propeller machines, and has succeeded in obtaining flights of over 600 yards. Mr. W. G. Billingham has in hand two very interesting hydro-biplanes, and the tests with these will be eagerly awaited. Mr. W. R. Halnan has been flying his tractor monoplane, and Mr. W. A. McLaughlin his single-propeller model at Mitcham. The hon. sec. has frequently had out his monoplane, ABC 76, and tractor biplane; also a small racer and a Groves biplane. There is still room for more members in the model section, and full particulars of the glider section will be forwarded to anyone making application to Mr. A. B. Clark at the above address.

#### The Croydon and District Branch (136A, HIGH STREET, CROYDON).

THE Croydon and District Club is now affiliated to the South Eastern Aero Club, and represents the Croydon District. This will no doubt greatly help and encourage our members, owing to the intercourse with many other model makers which naturally follows such a procedure. A great deal of good work has been done during February, both with tractor and other models. Messrs. Carter, Smither, Streeter, Bell, Pavely and Hart have all made and flown new tractor monoplanes. Mr. Pavely has been notably successful. He has raised the club's tractor duration record to 300 secs. and has had flights of 174 yards (officially measured) and others of 200 yards and over. An open competition organised by the club was held at Mitcham Common on Feb. 9th for tractor models (distance) and duration models. The club was fortunate to secure both first prizes. The tractor competition was won by Mr. Pavely with 174 yards, Mr. Chinnery was second with 136 yards. In the duration competition Mr. Hell was first with 55 secs. and Mr. Hart second (46 secs.). On the 23rd, Mr. Pavely obtained some fine flights with his tractor monoplane, as also did Mr. Hart. Messrs. Roden and Carter were also flying tractors. Mr. C. Smither had the misfortune to smash his large Martin-Handasyde monoplane. Mr. Clark, hon. sec. of the S.E.M.Ae.C., also turned up with his tractor biplane.



## CORRESPONDENCE.

### Negative Wing Tips and Lateral Stability.

[1728] I cannot quite follow Mr. FitzGerald's remarks (1715) in regard to my article on this subject, possibly on account of some misprint. In Prof. Bryan's nomenclature U is a constant and so cannot be a junction of z, while p and q are by his equations given implicitly as junctions of z.

I gather, however (perhaps erroneously), that Mr. FitzGerald is under the impression that Prof. Bryan's method does not allow for changes in the angles of incidence on the wings. It does do so, however, for all changes of incidence that can possibly arise from any motion of the aeroplane in still air.

No doubt the ideal method would be to calculate the stability of an aeroplane in air moving in all possible ways, but as this seems impossible one has to approximate to this result in two steps. Firstly to calculate the power in still air of return to its normal position for an aeroplane that has suffered a disturbance. Secondly to calculate the amount of disturbance any motion of the air can



possibly produce. Prof. Bryan's method does the first, and I have shown that negative tips improve this.

In the second step I have shown that negative tips can prevent any partial horizontal gust from causing a disturbance. That they do not protect an aeroplane from disturbance owing to moving air causing a difference of angle of incidence on the two wings was covered by my statement that they are not a protection against partial non-horizontal gusts (an equal change of incidence on the two wings causes no lateral disturbance). But to render the aeroplane immune to one class of gust seems to me valuable, as it is half-way towards rendering it immune to all gusts.

J. H. HUME-ROTHERY.

## Ammonia Gas for Dirigibles (1698).

[1729] Your correspondent, Mr. André Mas, says "this idea comes from Charles Tellier." I am not sure who Charles Tellier may be or when he propounded the "idea," but it may be of interest to know that I made experiments with ammonia for balloon inflation some thirty years ago, and pointed out the advantages of its employment in a paper on Military Ballooning at the Royal United Service Institution in June, 1883 (vide *Journal R.U.S.I.*). I found great difficulty from the gas attacking the retaining envelope, but with the new materials now on the market, such as Emaillite, referred to by Mr. Mas, this may no longer be a prohibition to its use. Ammonia, it must be noted, is heavy as compared to hydrogen, weighing about 46 lbs. per 1,000 c. ft. (hydrogen being only 5 lbs.), so that a balloon to lift a given weight would have to be double the size of one inflated with hydrogen.

B. BADEN POWELL, Major.

## The Rocket-Plane.

[1730] May I correct a statement in Mr. C. Heyerman's letter [1724] with respect to my rocket-plane, the drawings and descriptions of which appeared in FLIGHT, January 4th? Mr. Heyerman says I proposed to use the idea for launching full-sized hydro-aeroplanes. In my letter hydro-aeroplanes were never mentioned. It is true that Mr. V. E. Johnson mentioned, in his comment, that the idea might be of use in experiments relative to the launching of hydro-aeroplanes, but obviously he was referring to models, as further on he remarks that very interesting and valuable experiments of that kind might be made with a couple of dozen penny rockets and a suitable model.

Wimbledon.

L. F. HUTCHEON.

## Monoplanes and Down Gusts.

[1731] Some weeks ago I put forward elsewhere the following considerations concerning a possible difference between monoplane and biplane as regards the effect upon them of gentle vertical, or nearly vertical, currents—not steady currents, but pulsating or gusty ones. It may not be easy to establish anything like certainty one way or the other, for no one can pretend to possess a thorough knowledge of the "internal work of the wind," especially where the conditions are complicated by the conformation of the land. The suggestion can, therefore, only be put forward for discussion. But if it should be agreed that it is possible—even on rare occasions—for the conditions I have attempted to describe to be set up, my purpose will have been served, and it will only be necessary to study the subject with the practical experience of pilots aided by scientific knowledge. If these conditions ever occur, indeed—no matter how rarely—they deserve very close attention, since they affect the safety of aviators; any unsuspected or unexplained cause of accidents is a danger, and seeming small or trivial or rare causes ought by no means to be neglected.

Assuming the conditions are admitted to be possible, one defect of the monoplane will have been understood, and, therefore, will be on the way to be remedied. Probably it will appear that the best remedy will be a reserve of engine power, and that this is more necessary in the case of the monoplane than in that of the biplane. It may also appear that, apart from the question of relative speed, the monoplane flyer requires, if anything, a somewhat quicker mind and action than the biplane man. But, to summarise what I have put forward elsewhere.

There can be no doubt that many accidents to aeroplanes have been due to flying into downward currents at low altitudes. The lifting power of the machine in this circumstance is, in effect, suddenly diminished, even though the current be quite a gentle one. Without going into elaborate calculations, but merely to illustrate the point,—if an aeroplane be flying at such a speed that its surfaces drive the air down at ten miles per hour, and it enter a downward current of four or five miles per hour, the machine will be carried down, unless by the sudden acceleration of the engine its speed be increased by something like 50 per cent. It may be found that the monoplane, for the reason that it has the

whole of its plane-area exposed to the first attack of a vertical gust—unlike the biplane, which has about half of its plane-area partially masked by the other half—may be more easily upset in pulsating vertical or slanting currents. Many accidents, both to monoplanes and biplanes, suggest that downward currents near the ground have been chiefly to blame. The danger, when an aviator is flying over a crowd of people or over bad country, is obvious.

In the case of the biplane a vertical downward gust would at first affect little more than half of the total lifting surface of the machine. The imposition of the full weight of the gust would be slightly less sudden than in the case of the monoplane, whose whole surface would be struck at once; and the pilot would have a slightly better chance of manipulating controls and accelerating engine in time to recover. Of course, the interval before the whole of the biplane came under the influence of the gust would be very brief; even so, it might make a considerable difference to the pilot's chances.

Apart from the greater general speed and the greater loading per square foot of most monoplanes (as compared with most biplanes), there appear to be some not yet fully understood differences in the stability of the two divisions.

CHARLES C. TURNER.

## A Correction.

[1732] In last week's FLIGHT it was stated that I obtained my flying tuition at the Ewen School, Hendon. May I point out that I was entirely self-taught, upon my own machines—viz., a Caudron biplane and Blériot pattern monoplanes?

GEORGE LEE TEMPLE,  
Temple Flying School.

Hendon. February 25th.

## The Wulffing Airship.

[1733] Will you kindly insert the following correction to my letter (No. 1727) giving the measurements of the Wulffing airship?

The average diameter should read:—37½ ft. and not 35 ft. as given, otherwise the capacity would be 312,000 cubic ft. instead of 350,000.

Wandsworth Common.

T. H. GREEN.

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Revue Générale de l'Aéronautique Militaire Théorique et Pratique. Nos. 13 and 15. October and December, 1912. Price 1 fr. 50.

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